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Including the Proceedings of the
AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

VOLUME XIII MAY 19, 1924 NUMBER 8

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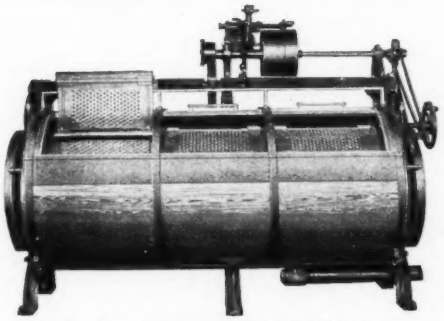

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VOLUME XIII NEW YORK, MAY 19, 1924 NUMBER 8

The Amount and Type of Research an Effective Dyehouse System May Include

Type of Manufacturing Department Referred To—Research Applicable to Such a Department—Importance of the Relation with and Attitude of Management—Necessary, Ambitional and Optional Research—Cost of Operation and the Nominal Research Budget

By HIBBARD S. BUSBY

Consulting Colorist

AS may be supposed, research, in the sense of advancement of the boundaries of pure science, can have very little part in the program of any except the larger and more extensive commission dyehouses, although an adequately operated one of these, of high grade, may well include in its activities enough of the type of applied science research described in this article to be at once an investment and an insurance factor as well as a reliance in the various annoying troubles encountered with such complicated materials as textiles and modern synthetic dyes.

The dyeing or other process department to which the following discussion is applicable is, more particularly, that section or sections known as the dyeing and finishing department of most large textile mills. It includes the operations of preparation, dyeing, bleaching, printing, finishing and all other wet processes to which the yarn or cloth of the mill is subject as well as the pressing and hot finishing operations. Within its scope, also, are any special experimental departments being developed either for the purpose of meeting unusual finishes required by seasonal style demand or new types of fabric or finish not possible of production in the regular system of running the product.

The existence of the departments described above presupposes their function as auxiliaries to the later operations of weaving and other departmental operations necessary to the final manufacture of special fabrics.

In order that this auxiliary department, the dyehouse system, may truly serve the ends of the business to the ultimate objective of better sales of the product it is necessary that a certain attitude of mind be dominant in any investigatory, control, improvement and standardization work carried on in and for its betterment. It makes very little difference if the plan of organization of the business as a whole is a sound one, whether the technical director responsible for carrying out such work is actively the executive over its installation or is employed merely in an advisory capacity for the sake of whatever benefits he may be able to contribute to the business; the point is, there must be kept constantly in mind that any deficiency in process or method, or any lack in any part of the system which will bear improvement is, from the point of view of the right sort of technical man, a business disease which he is just as much in honor bound, by the ethics of his profession, to adjust as is the physician or surgeon bound to right any sort of pathological condition he encounters, whether it be the one described to him by his patient, or detected from the symptoms. For that reason, in the absence of specific instructions as to *method* the technician has no choice but to correct all and any evils he encounters and to proceed by whatever method is *known* by him to be an effective one for their remedy.

Research Applicable to Such a Department

It will be the purpose of a later paper to describe methods for centralizing and co-ordinating all the color problems of a textile business under one controlling system. For the problem of the dyehouse system proper and the way in which it affects and is affected by contiguous departments it is well to enumerate the various kinds of problems encountered and to suggest, briefly, methods of treating them.

Research is a much abused and overworked word, therefore, in this article it is to be limited in its meaning to that form of activity which embraces the investigation, study and search of the realms of existing organization, materials, processes and methods, as well as the unknown or pure-science lore of the relation of these things to their utility as tools for the carrying out of

processes of manufacture required by the dyehouse system for its proper operation.

First of all, a careful study must be made of conditions existing in all sections of the department and the technician should make himself thoroughly familiar with not only the methods in vogue but the details of their execution. This is of fundamental importance lest some detail be overlooked and be found to affect, vitally, the course or the efficiency of a process later developed for works-scale installation. This study of conditions should embrace complete investigation of matters of routing, storage, personnel responsible for various details, the time element, process conditions, materials, methods, control facilities, etc., in short, every bit of detailed information that will enable him to see the complete operation as a true picture whenever he contemplates any alteration or new installation.

Second, the department should be considered from the point of view of the most apparent needs evident *and possible attainment under the conditions which exist.* These needs may be a matter of process deficiency or in the form of a call for assistance (on properties of some fabric) by the sales department. This consideration of what can be done with the facilities immediately available is of primary consideration because of its assistance to the budget in that it may bring some returns without prior expenditure, a factor which has to be encountered soon enough.

The third stage of procedure calls for a very high degree of skill and judgment; a graphical analysis of the condition resultant from plotting the results of this second study upon the findings of the first survey, and from it determining the necessary:

Readjustments in operation planning.

Standardization of conditions surrounding work and development of process technique which must be effected.

General classification, standardization and realignment of methods of handling work and standards of reference upon which quality of production depends.

Pure science problems which demand early solution lest manufacturing and standardization programs encounter serious obstacles.

Formulation of and inauguration of program based upon these findings.

Evolution and execution of this program.

It is perhaps cause for question as to why a graphical analysis should be made of this condition. There are several important reasons, the chief of which is that any plan which lends itself to graphical delineation is far more apt to be in better form and it is certainly in better condition for reference and application. Then, too, graphical representation provides in an unmistakable fashion for inclusion of the factor of the relative importance of the various elements, and the value of having all elements properly weighted is too great a matter to be passed over lightly.

A proper graphical layout of such findings is not one of those mysterious things which is said to be obtainable only from long-haired specialists. Some of the best graphical studies of this kind have been worked out by men who have spent all their lives in a plant and have a knowledge of graphical methods only from their own private study of them as the technique of scientific management has been brought to their attention. The important thing in this consideration is to assure that a man who has enough scientific skill to make the necessary surveys (and be capable of directing a program from start to finish for handling the problems encountered) has also the management sense to visualize the effect of his recommendations upon normal works programs and regular routine.

It will be noticed that this third stage of procedure goes beyond the point of merely making use of the existing resources, without alteration or upset of conditions, and requires that the technical man shall formulate his program of action and set it in operation. This calls for the demonstration of qualities of management giving evidence of knowledge of economies and in the fullest sense a realization of the relative importance of the various factors involved and remedies suggested. Here the balance sheet must be constantly borne in mind as the end and aim of all activities.

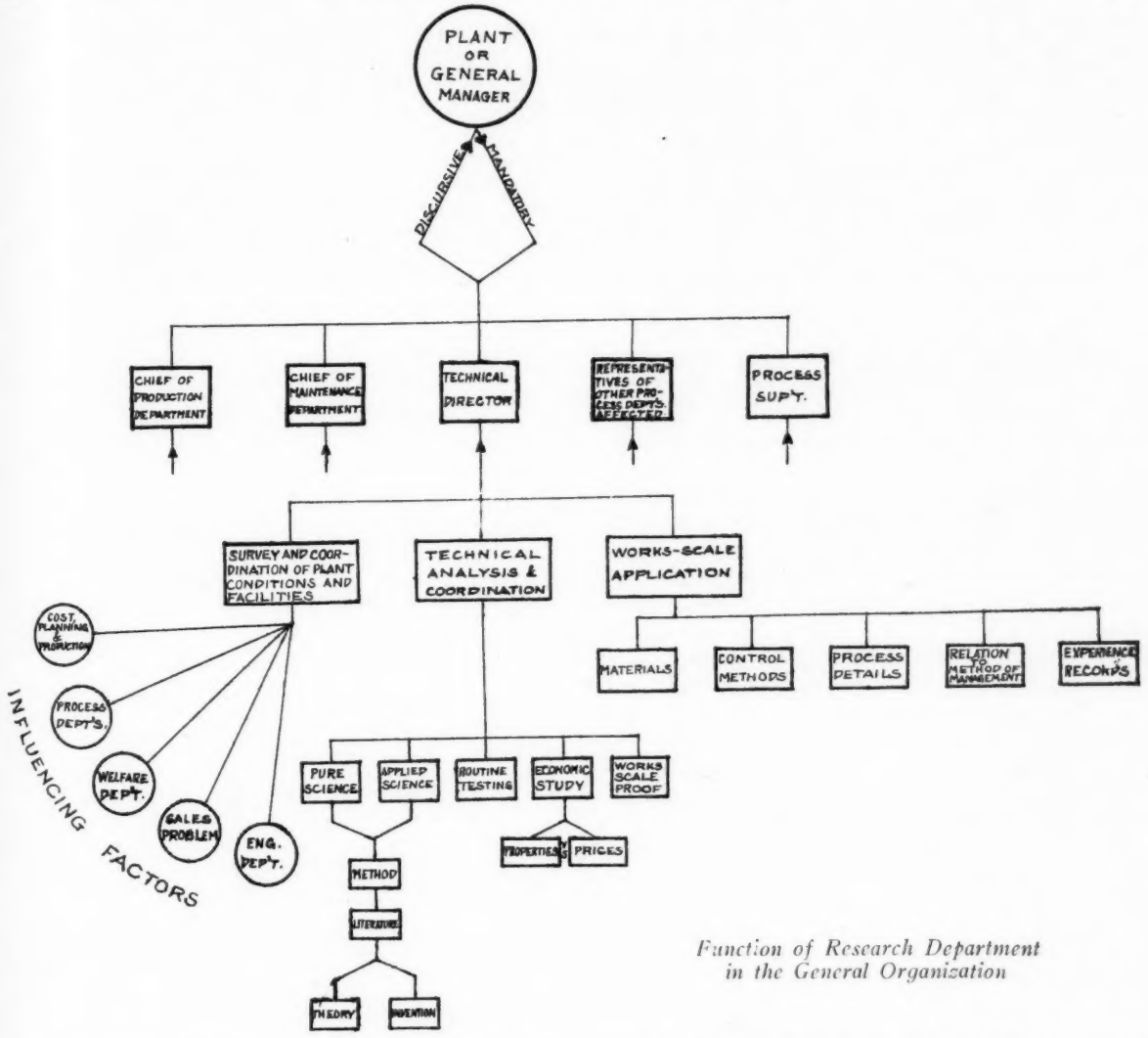
The first two items listed under the analysis are frequently susceptible of handling by means of a program of training, demonstration or mere instruction as to the necessary alterations in method or procedure. Here cooperation is a first essential in order that results may be obtained without undue expenditure of either time or money and the way be cleared for the more vital work. Great care should be taken, however, to have the whole program thought out before instructions are issued for these preliminary changes; confidence in future operations depends, to a large degree, upon the propriety of the instructions in this first stage, to say nothing of the far-reaching effect they may have upon later instructions.

The third item listed may be handled altogether by means of changes in the clerical system, routing procedure or even through conference and discussion among all the heads of departments affected.

The fourth item can be definitely established only after thorough familiarity with the literature on the subjects which seem to indicate the need for pure-science investigation. The need must first be established and then there must be assurance that the ground has not been covered already.

Importance of the Relation with an Attitude of Management

It must be apparent to any technical man, whatever his relation to an organization, either advisory or executive, that at least where several departments (not his own) are involved much of the impetus to a program depends upon the start and sponsoring it receives from the executive authority over the whole organization. This is natural in view of the dependency of each department upon that head for direction as to policy. More



Function of Research Department in the General Organization

than this factor, however, is the fact that the general managing head is more in touch with the effect of one department's acts upon all other departments than the head of any one department should possibly be, and it is to this policy of general management that the technical program should ally itself in order to insure its smoothest functioning and adoption. The point is that whether the relation of the technical man be executive or advisory it is to his advantage and the interest of the program to have the orders for execution of its details within the process departments emanate from the general manager of plant.

This will be better understood upon appreciation of the place properly occupied by the research department. Research activities are (properly) investigatory, advisory, corrective, and as example for standards of practice; on the other hand the function of an executive head, whether he be merely of the application department charged with carrying a program into effect or the executive head of the entire factory, is to sell the idea, to push and incorporate its provisions and to be morally responsible for the attainment of results demonstrated as feasible by the findings of the research department. It is, ostensibly, a policy of vacillation and lack of surety in the executive policy to put that half of the program up to the research director (unless he assume the functions of general manager at the same time). On the other hand, the research director must be sure that his conclusions are sound, and it is ever the function of the management to make him prove every step of his conclusions before a single order be issued for incorporation, even as a trial, in works departments. From most of the experience encountered in the past it would seem wise also not even to propose or discuss the matters in question with process department heads until the management itself is willing to line up and unqualifiedly support the program in all its details. No one is so ready to seize upon a weak spot in management as a process foreman who does not want to be disturbed from his lifelong habits.

The management of long duration in a business has knowledge of old problems which have haunted opera-

tions for years, it is, therefore, a fortunate research department that is closely enough associated with management to be made acquainted with these skeletons of the business. They are frequently the most fruitful basis upon which to build a reputation, while doing a real service to a business and an industry.

Necessary, Ambitional and Optional Research

A certain amount of research is unavoidable in any large plant that has developed over a period of years, if for no other purpose than to bring things up to date in good practice, in accord with the nominal development in allied lines. Standardization, also, is a thing which is not static and unless included in a regular program of development not only lags and frequently ceases altogether but invariably costs an unnecessary and excessive amount for each spasmodic renewal of activities. Progressive improvement of plant, also, entails conditions calling for constantly greater and greater tax upon the various processes, and of this improvement the development of machinery alone is a constant source of demand upon the ingenuity to equalize, it being a well-established fact that each considerable evolution in process machinery calls for some sort of readjustment in one or more of the attendant processes. All research of this kind is necessary to the very existence of a well-managed manufacturing operation. It will be carried on whether or not it is dignified with the name and it should properly be included in a separate department.

There is another type of research which, in type and degree, is governed by the height of the position aspired to in the competitive goods market. In one way this is improvement or quality research, though sometimes it becomes very fundamental and a matter of existence when materials and general conditions are on the decline in quality. However, the line is never very clearly established as to whether this type is completely ambitional or forced by the necessity of circumstances, it depends altogether upon the conditions which class it falls within, even for the same type of activity at two different periods. In this class are most of the problems of quality which react upon market as choice of color combinations, fastness of various dyes, determination of best adaptable styles in color combinations, etc.

In the same sense, there is a type of research open to the far-seeing that at times appears to closely rate inclusion within that classed as ambitional, while at other times it is most certainly forced by the trend of the times in market demands. Reference is made here to research to discover marked advancements in method or the use of materials. Much of this research is based upon efforts in pure science research and is seldom effected without very definite investigations in the field of fundamental physical and chemical laws. This is a very forward-looking type of work to be undertaken in the average textile mill laboratory, few of which are adequately equipped for it, but it offers constantly new prospects to the courageous.

The relatively small cost of budgeting an activity of this kind is hardly ever appreciated. The trouble is that big efforts and activities are demanded, all of which entails correspondingly big outlay to get into operation. On the other hand, the secret of success in this is perpetual effort, small in amount but constant and regular in purpose. If such a plan is adhered to throughout times of smooth sailing there is apt to be much less frequency of the emergency demand which the very best of research talent can hardly meet without some preparation and expenditure of time, before any results of a practical nature are in evidence. If the research department will be granted even a very moderate allowance for this purpose and will keep constantly before it a proper graphic analysis of the demands of this kind encountered it is safe to say that many of the most vexing problems that now trouble the industry will not be long in reaching adequate solution.

Cost of Operation and the Nominal Research Budget

The question of how much of a budget to apportion to research activities is one of the most difficult to answer in a general and all-inclusive way of any problem in consulting practice. A carefully developed analysis and survey of a business, together with knowledge of the market conditions faced in the particular industry, nearly always present a good basis for determining the answer to this question for a specific firm. The consideration of a general answer to the question will have a good background if some of the conceptions upon which such a budget is sometimes calculated are taken into consideration.

Undoubtedly the value of the investment in plant is a factor of vital importance in this connection. I believe it to be a fairly well-established matter to-day that research is an insurance measure, particularly in a chemical industry. In a sense, the plant figure to be considered should be not only that portion of the plant actually occupied by the dyeing department activities themselves, but as well a reasonable proportion of the entire plant that is occupied by subsequent operations. It is possible to lay out a pretty comprehensive and logical analysis of the insurance factor value of the research from this point of view, particularly in view of the experiences encountered in the past where this particular department's acts have had a very marked effect on the value of completely manufactured product.

A certain relation must exist between the average normal increase in business over a significant period of years and the amount which should be spent to maintain it, increase it or insure its regularity. As well should be considered the relation which rate of increase in business bears to the capitalization and thereupon the degree to which the budget spent to insure constantly increasing profits affects the most vital asset of the business.

Quite recently a number of important surveys have been made to study the relation between advertising cost and other business-getting expenditures of a business

In the first place, any research which improves or guarantees high quality is a factor of advertising of the highest order, a type of advertising message understood by the most ignorant purchaser. In the surveys made the very apparent ratio between business growth and advertising budget precludes argument, therefore, all the factors entering into an "advertising" budget, as described, must have proportional utility.

The figures for cost of operation of a large plant reduced to basic ratios disclose that a relatively small proportion of the entire operating cost goes to make up those guarding factors upon which a stabilized industry is maintained. By far the preponderance of cost is expended upon basic materials and labor; the items of supervision, interest or premium paid for the basic types of protection (insurance), etc., receive a small proportion in their total. In fact, this total is frequently less than the cost of placing various types of insurance upon every factor of risk in a large business. There is certainly room here for larger apportionment to the research factor, particularly when so very much can be done in a well-managed plant on small research expenditure. Twenty thousand dollars per year will finance a rather tremendous research activity, twelve a very extensive one, and it is frequently possible to do very vital and necessary work producing immediate returns on seven or eight thousand dollars for the annual budget of the first few years. As the earnings of the department increase it is, of course, entitled to more extensive capitalization.

The budget for research operations depends, in addition to the actual funds available and these factors described above, upon the outlook and vision of the controlling element in the management. That is, of course, for an *extensive* program of research. There is a safety factor of research which *must* be done in any large or medium-sized plant, and it cannot be sidestepped without later payment of the cost of such neglect, with interest, usually at a very high per cent. This necessary minimum should justify its existence even to the extent of including the funds of its supporting budget within capital necessarily hired for operation and normal expansion.

There is an irreducible minimum of activities which must be carried on in order to set up the nucleus of research activities. Included among these are the following:

Cost of keeping adequate records of process experience.

The services of at least one high-grade technician.

The service, in part or whole time, of competent junior investigators in the plant (under direction of the technician).

A constantly maintained and uniformly conducted amount of routine testing work.

The chief technician may be simply in an advisory relation to the organization of the business or he may be in charge of a definitely organized research department; he may do chiefly pure science or chiefly plant application investigations, but it will not do to mix the activities of a man charged with important responsible investigatory work and that of a man occupied with matters of detailed testing and routine studies.

Most of the successful research budgeting that has been encountered was based upon pretty thorough analysis of several of the factors described above. It would seem well to have all of them in consideration, and in some cases there are additional factors which affect the proper consideration of that subject. Experience seems to point to an ideal research budget as proportional to the relative weights which these several factors bear to the general situation in which the particular business happens to be situate.

BRIEF HISTORY OF SILK DYEING IN ADDRESS AT HISTORY DINNER

At the "history dinner" of the Silk Dyers' Mutual Protective Association of America, held at the Elmwood Country Club in New Jersey, Tuesday evening, May 13, George A. Post, vice-president of the Silk Association of America, presented an address in which he described the early efforts of the silk industry in America. After mentioning many of the leading pioneers in Paterson's greatest business, and telling of the industry's humble beginning in Paterson in 1838, Mr. Post went on saying:

"The next historical development of the silk industry was right after the Civil War when, due to a protective tariff, the industry started to boom. The developments in the dyeing industry at that time, I find, began in 1860 with the formation of a dyehouse by a Mr. O'Neil. In 1865 silk dyeing was started in Philadelphia, and in 1866 Mr. Greppo organized his plant in Paterson, making such a success of it, apparently, that in 1876 he took in Jacob Weidman as a partner.

"Weighing at that time, to my recollection, was done with sugar, sumac and gall. I used to buy real logwood chips and gambier from Mr. Androvette, who is still as full of pep and young as ever. Mr. Blackburn from Geigy Analine Works, and Mr. Marmon from Philip Kaicher were also leading figures at that time.

"The first big development toward the modern dyeing industry was the formation of the National Silk Dyeing Company as composed of Auger & Simon, Lotte, Geering, Gaede, Kearns, Koupscher & Mans, Dundee Lake.

"Co-operation is the life of industry and I feel sure that every manufacturer in this country is willing to conceive that without the help of the dyers and the organizations which they have built up since the early days, we would not have been able to compete as we have with Europe and its knowledge of centuries. Nor would we have been able to stage three magnificent silk expositions in 1921 and 1923, proving to the world the superiority of American silks, not only as to quality, but as to design and color.

"Your project to prepare this history of the dyeing industry in this country is most commendable. Nothing should be more inspiring to future generations than to read over in such form the struggles of their forefathers in placing the industry upon its present basis."

The Conditioning of Wool

Physical Properties of Air-Steam-Water Mixture—Wool with Too Little Moisture—The Water-Spray Process—Operating Details—Use of Pressure in Producing Water Supply—Details of Design and Operation—Maintaining Right Moisture Content in Wool

By PAUL RAUER

(*Textilberichte*, 1924, *pages* 161-162)

Translated by Ismar Ginsberg, B.Sc., Chem. Eng.

THE technologists who are concerned with the operation of giving wool yarn the necessary 18.25 per cent of moisture that it requires for buying and selling purposes must bear in mind many details that must be carefully followed and controlled in carrying out this process. Mistakes in operation and faults with the finished product are mostly due to the fact that the apparatus which is available for carrying out the operation and which is found in most small plants, while it is comparatively simple in construction, is not thoroughly understood so far as its manipulation is concerned.

The conditioning of the wool yarn is carried out by the agency of air, water and steam, and these factors admit of wide variations. Furthermore, the technologist is always concerned with the influence which these factors may have on the woolen yarn under all conditions. Hence he is concerned with more than merely the ordinary absorptive capacity of the woolen yarn for adsorbing moisture.

In order to obtain a more definite idea of the simple conditions that control this process, it is first necessary to look into the physical properties of the water-air-steam mixture.

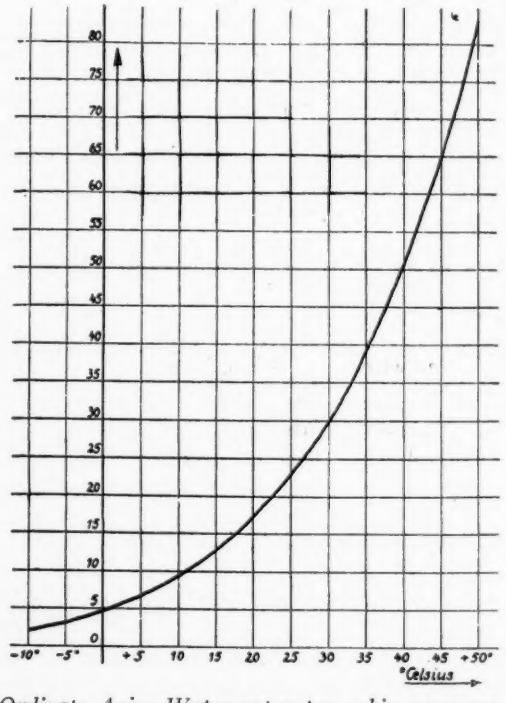
The Physical Properties of the Air-Steam-Water Mixture

It is quite well known that the quantity of water that can be absorbed by the air cannot overstep a certain definite maximum. This maximum is dependent on the temperature of the air, and rises and falls as the latter increases and decreases. It is also dependent on the pressure of the air, and varies with it in the same manner.

Hence, a cubic meter of water vapor at 0 deg. Cent. weighs 4.9 grams. Consequently, it may be said that the air, at a temperature of 0 deg. Cent., is able to carry a weight of 4.9 grams of water. The *excess* of water that attempts to add itself to the air at this temperature is immediately precipitated as dew. At a temperature of 11 deg. Cent. the air will carry about double the quantity of water vapor; at 18 deg. Cent., three times as much as at 0 deg. Cent., etc. From these figures it is easily seen that air absorbs and holds far more moisture at the higher temperatures than what corresponds to the actual increase in the temperature.

The curve sheet below shows the maximum amounts of water vapor that can be held by the air at various temperatures Centigrade, the weights of water vapor being given in grams. When the temperature increases from plus 5 deg. Cent. to plus 10 deg. Cent., the increase in the maximum water vapor content held by the air is 2.5 grams; when the temperature increases from 15 to 20 deg. Cent., the increase in the weight of water vapor is 4.5 grams; and finally, when the temperature changes from 20 to 25 deg. Cent., the amount of water vapor that can be held by the air increases by 7.5 grams.

If the temperature does not increase in the right



Ordinate Axis: Water vapor per cubic measure; maximum absorption of water vapor by air in grams per cubic centimeter at temperatures from 10 *deg. Cent., to* +50 *deg. Cent.*

proportion, then the excess water vapor in the air is precipitated as dew. Hence the curve which is shown below is really the dew point curve of air, which means that it tells the temperature at which air becomes saturated with water vapor and cannot hold any more of it. This is the most important point that must be taken into consideration in the entire moistening process and the conditions under which it is carried out. This is true whether the process is controlled by variation of the temperature at which it is accomplished or by varying the moisture content of the air that is used in conditioning the wool.

Two Important Conditions

In practice two cases arise; or, rather, they are most important of all that may occur and must be given special consideration.

In the first place, the wool may have too little moisture and hence a certain amount of water vapor must be added to it by the aid of steam of the proper degree of wetness.

In the second case, the wool contains the requisite moisture which should be retained by it.

Wool With Too Little Moisture

This case must be considered first. There are various methods by which it is possible to cause the wool to absorb the requisite amount of water vapor. The simplest way of doing so, and also the most risky of all methods, for it does not give good results even when very carefully controlled, is the steaming process. It is very easy to load the wool with the proper amount of moisture by subjecting it to the direct action of moist steam. As simple as the method appears, just so dangerous it really is. In the first place, it is known that many dyestuffs will not withstand the action of the steam. Thus, if the temperature is allowed to rise just a little too far, not only dyed wool but also the undyed crude white wool suffers injury, in that color changes are produced in the fiber which impair the value of the fabrics. It is recommended that this process not be used for this purpose.

The Water-Spray Process

The following process, which may be called the water-spray process of moistening wool and woolen fabrics so that they are given the proper standard moisture content, is absolutely harmless to the wool and gives good results.

In this process direct steam is not employed, but atomized water in the form of a fine spray is employed. The atomization of the water is accomplished by discharging the water under pressure through specially constructed nozzles. The disadvantage of this process lies in the fact that the consumption of water incurred in its operation is too large. It must be remembered that the water employed for this purpose must be thoroughly purified before it is used, to avoid stopping up the nozzles. Furthermore, to obtain a finished product which contains the requisite amount of moisture it is necessary to build an installation where the goods may be properly ventilated, exposed to the air.

This is in reality a drying arrangement and has been found to be very useful in correcting mistakes that are made in this process. It is possible that the woolen cloth or yarn is made to absorb too much moisture, for the water is thrown against the material with considerable force during the moistening process. The drying arrangement permits the removal of the excess moisture.

Operating Details

In general, the operation of this process offers no difficulties of a serious nature. The only difficult matter is to effect the proper conditioning of the wool at low atmospheric temperature without the use of heat. However, it is always possible to avoid this difficulty by providing the chambers or moistening boxes in which the process is carried out with a suitable heating arrangement. If it is desirable to avoid the expense involved in building a heating installation, the aforementioned difficulty may still be circumvented by preheating the water before it is employed in the moistening process.

From the curve which is given in this article it is easy to see that the principal condition that must be controlled in the moistening installation, no matter how it is designed, is the temperature of the air at the outlet of the apparatus.

The Use of Pressure in Producing the Water Supply

A second way of carrying out the conditioning process—this can only be used in building a new installation—is described below.

The water is atomized in specially constructed nozzles by means of compressed air and with the aid as well of the suction action that is produced by such an operation. This process possesses several advantages.

In the first place, the consumption of water is much less than that in the first-described process. The introduction of compressed air produces a ventilating or drying effect, whereby mildew and stopping up of the nozzles is prevented. The one disadvantage possessed by this installation is that the conversion of the water into the form of water vapor in this process, accomplished by the constant introduction of compressed air, causes the removal of heat from the installation and cools off the moistening chamber very considerably. This disadvantage, however, can be readily overcome by providing a satisfactory indirect heating sys-

tem within the same. It is claimed that this installation will give the best results of any moistening system, and that it should be installed wherever a new installation is being considered or where improvements in an old installation are under project.

Details of Design and Operation

Moreover, it is of great importance that the moistening chamber proper, in which the water vapor is produced, should be near the yarn box. This avoids the otherwise unavoidable precipitation of the moisture. If this is impossible in existing installations, then there are numerous ways in which to circumvent the precipitating action. Care must also be taken in the design of the nozzles and in the number of nozzles placed in the moistening chamber. Too many should not be employed. This is a fundamental factor in the design and operation of the process, as the results that are obtained are dependent not on the number of the nozzles used—and hence on the quantity of water that is introduced into the moistening chamber—but principally by the temperature; in other words, by the capacity of the air of absorbing water vapor. When the hygroscopic wool is given the opportunity to come in contact with air containing water vapor under the correct conditions, then it absorbs the necessary amount of moisture without any difficulty and the conditioning process is successfully accomplished.

Maintaining the Right Moisture Content in Wool

The second of the two principal points mentioned above must now be discussed in some detail.

The woolen material, which has been made to absorb the correct amount of moisture in any one of the ways described above, should retain this moisture. Here again the curve sheet affords interesting and important information in this connection. From that curve it is easy to see without any further study that air cannot absorb much moisture at low temperature.

Hence the temperature and the moisture content of the water-vapor-air mixture must be maintained at such points that it is not possible to remove any of the moisture that the wool has absorbed.

Furthermore, it must be remembered that this is possible without the use of any other agency than the temperature, when the moisture of the air in the rooms in which the wool is stored is kept around a figure of 95 per cent. That is, the air contains 95 per cent of the maximum quantity of moisture it can hold at the temperature. It is not advisable, and in fact something to be avoided under all conditions, to use air containing a higher percentage of moisture, for the simple reason that when the moisture in the air is in the neighborhood of 100 per cent of the amount that it can retain at a maximum at the temperature, precipitation of the moisture as dew may take place.

It is recommended that the temperature of the air which comes in contact with the conditioned wool is as low as possible. For the lower the temperature of this air the less water it is able to absorb and hold, and hence the less moisture it is able to remove from the conditioned wool.

It is also necessary to limit the access of air to the wool and the ventilation of the room in which it is stored as far as possible, for this is the principal way in which the moisture of the woolen materials can be removed.

The author is able to conclude from his own personal experience with the process of conditioning wool that when the process is carried out as has been described above, and when the precautions are taken as he has recommended, the results obtained will be entirely satisfactory and will more than compensate for the trouble taken.

AN INTERESTING SIDELIGHT ON FOREIGN TRADE

The twenty-fourth annual banquet of the Manufacturers' Association of Washington was held in Seattle, on board the steamship "President McKinley," April 24. This banquet was attended by two hundred and fifty members of the association.

A. F. Haines, vice-president of the Admiral Oriental Line of Seattle, who spoke on the subject of foreign trade, proposed an effective method for developing an American merchant marine which apparently is sound and logical, and offers at least one solution to the problem of competing with foreign marine interests.

"The American manufacturers are rapidly reaching the point of saturation," he said; "they must have a field for their surplus. That field must be in foreign countries. Japan, China and other countries of the Far East are wonderful fields for disposing of your surplus; but the American manufacturer cannot succeed in foreign trade without a merchant marine.

"The American shipowner does not want a subsidy in cents per ton per mile, but he does want the assistance of the American manufacturers. One of the best ways you can assist is to quote prices and sell your goods on a c. i. f. basis; control the routing. In the same manner, buy all of your goods from foreign countries f. o. b. port of shipment and again control the routing. This is the practice of other nations.

"This is how foreigners control a large percentage of our foreign trade. They sell our imports to us delivered. They purchase our exports from us and make their own delivery. The results is that foreign steamers are filled with our foreign trade, while the American steamers must be satisfied with what the foreigners cannot carry. Here is your opportunity to give the American merchant marine a subsidy and at the same time benefit yourselves without cost."

Scientific Washing

Part VII—Bleach (Concluded)

Non-Chlorine Bleaches—Peroxides—Potassium Permanganate—Sodium Perborate—"Reducing" Bleaches—A Friendly Word to Scientific Launderers

By F. H. GUERNSEY
Chief Chemist, Cowles Detergent Company

THE use of peroxides as bleaching agents is practised to only a slight extent in the laundry industry, but as their importance in the bleaching of wool, silk and dyed cotton goods is becoming recognized, we give a brief discussion of their properties. The most common peroxides in use are sodium peroxide and hydrogen peroxide.

Sodium Peroxide.—This is a rather dangerous chemical to handle unless its properties are fully known, but if the necessary precautions are taken, the danger is reduced to a minimum. Its chemical formula is Na_2O_2, and when dissolved in water, a double decomposition occurs in which caustic soda and hydrogen peroxide are formed.

(Sodium Peroxide) + (Water) = (Caustic) + (Hydrogen Peroxide).

As it is impossible to conduct the bleaching operation in the presence of caustic soda on account of its destructive action on the fiber, the alkali is neutralized by sulphuric acid, the caustic soda being thus converted to harmless sodium sulphate. An excess of acid is used to assure complete conversion of the caustic soda, and as the bleach is more effective in an alkaline solution a small amount of a combined alkali (or ammonia) is added.

We now have an alkaline solution of hydrogen peroxide which gives up oxygen for bleaching according to the following reaction:

(Hydrogen Peroxide) = (Water) + (Atomic Oxygen).

Hydrogen Peroxide.—Ordinary hydrogen peroxide appears on the market for medicinal, chemical and bleaching purposes in the form of a dilute solution (about 3 per cent) containing a slight excess of sulphuric acid. If this is neutralized carefully, as in the case of the Sodium Peroxide and Sulphuric Acid process, the solution formed is essentially the same and may be used in the bleaching of silk and wools.

Potassium Permanganate.—Potassium permanganate has also been used, in a small way, as a bleaching agent suitable for use on wool. It can be used in either an alkaline or acid solution, although it has greater efficiency in an acid solution.

When used in a plain water solution or an alkaline solution, a brown deposit of manganese oxide is formed. This is removed by reduction to manganous oxide by a reducing agent such as bisulphite or oxalic acid, although an excess of these latter should be avoided.

Sodium Perborate.—This compound, formula $NaBO_3$, when dissolved in water, produces an alkaline solution of hydrogen peroxide which is easily substituted in many cases for the solutions prepared from sodium peroxide or commercial hydrogen peroxide. When sodium perborate is completely neutralized with acid, a greater yield of hydrogen peroxide is obtained. Sodium perborate is quite stable, and for this reason is frequently found as an ingredient in soap powders.

In the laundry industry, the peroxide, permanganate, or perborate bleaches cannot compete with chlorine bleach on a cost basis for general use, but for special cases of wool or silk bleaching they may be used to advantage. In the textile industry, the sodium peroxide bleach is gaining in popularity, and the larger scale operations afford a more attractive cost.

The "Reducing" Bleaches

As stated in the early part of this paper, the reducing bleaches function by taking oxygen away from the goods to be bleached, while the oxidizing bleaches add oxygen to the goods to be bleached. The reducing bleaches are comparatively few in number, in fact, there are but two which are in commercial use, namely, the "sulphite bleaches" and oxalic acid.

Sulphite Bleach.—The sulphite bleaches consist of some form of sulphurous acid. For convenience, the acid sulphite or sodium bisulphite is often used, while on larger scale operations in the textile industry, sulphurous acid is formed and used directly by burning sulphur and conducting the sulphur dioxide gas into contact with moist textiles. These bleaches may be used for bleaching wool and silk, and in the laundry industry are valuable in two respects: First, as combined neutralizers for oxidizing bleach; second, a safe sour.

Mention should here be made of the fact that the sulphites are often deleterious to dyed colors, and dyed goods should, in consequence, be handled with due care.

Oxalic Bleach.—Oxalic acid is seldom used in the textile industry on account of its comparatively high cost. It is valuable in the laundry industry as a neutralizer for oxidizing bleach, as a good sour, as a reducing bleach, and as a removal of iron stains. The effect of oxalic acid upon the fibers is, however, more pronounced, and thorough rinsing is required.

A Friendly Word to Scientific Launderers

There is more of an excuse for the use of bleach in the textile industry than in the laundry industry. The textile manufacturer is confronted with the problem of removing natural impurities and discoloring pigments. If the textile manufacturer is successful in producing the desired white, without unduly affecting the fiber structure (oxycellulose formation, etc.), the launderer should, by proper methods of washing, maintain that same degree of whiteness, without resorting to excessive use of bleaching agents.

The launderer should aim to remove dirt and stains as far as possible by application of scientific principles in washing, instead of disguising their presence by bleaching them white and allowing them to accumulate to an eventual point where neither washing nor bleaching will restore the original whiteness without a deleterious effect upon the fiber strength. Constant effort on the part of the launderer to reduce the use of bleach in his plant will be well rewarded.

(End of Part VII)

Dyestuff Tables

A List of the Principal American-Made Colors with Their Properties and Fastness Characteristics

[Note: The publishers of The Reporter have secured more or less complete data in regard to many of the dyestuffs which are at the present time being manufactured in the United States. As the following material has been brought together from various sources, they realize that errors are quite likely to appear, and it is earnestly requested that any readers who find errors or who are able to give additional information will communicate with the publishers in order that this material may be made as correct, complete and up to date as possible. These tables will appear serially until all colors upon which we have data shall have been covered.]

ACID ANTHRACENE BROWN R

(Schultz No. 88)

COMPOSITION: Pikramic acid brown.

SPECIALLY SUITABLE FOR: Wool.

USUAL METHOD OF DYEING: Top or bottom chrome.

SHADE: Reddish brown. The shade must be watched carefully, as it changes to olive on continued boiling.

SHADE BY GASLIGHT: Unchanged.

SOLUBILITY: Excellent in the paste.

LEVEL: Not level enough for pieces except in dark shades.

EXHAUSTS: Well.

FASTNESS TO:

Acid: Fast.
Alkali: Fast.
Fulling: Good against white wool if afterchromed; against white cotton it stains.
Ironing: Fast.
Light: Better than S-89; suitable for men's wear.
Perspiration: Fast.
Rubbing: Fast.
Sulphur: Somewhat yellower.
Washing: Bleeds off if not afterchromed.
Finishing: Very fast if dyed top chrome.

OTHER PROPERTIES: This color dyed top chrome is of a fastness equal to Alizarine Brown (S-782).

DYED BY OTHER METHODS: If dyed on a chrome mordant it is advisable to add ½ per cent of chrome to the bath at the finish and boil for half an hour. In this manner shades perfectly fast to fulling and scouring are produced.

ON OTHER MATERIALS: Adapted for dyeing chrome padded and discharged cotton pieces.

PRINTING: Suitable for printing on slubbing with acetate of chrome and also for cotton printing with acetate of chrome. It gives the best results with unoiled material. It stands a slight chloring and a soaping at 80-105 deg. Fahr.

COMPETING PRODUCTS: Made in the United States by National Aniline & Chemical Company; E. I. du Pont de Nemours & Co.

METACHROME BROWN B

(Schultz No. 89)

COMPOSITION: Pikramic acid brown.

SPECIALLY SUITABLE FOR: Wool.

USUAL METHOD OF DYEING: Chrome bottom top chrome or chromate with metachrome mordant. Easiest to control the shade bottom chrome.

SHADE: Not as red as S-88.

SHADE BY GASLIGHT: Very little change.

SOLUBILITY: Good in paste form.

LEVEL: Does not dye level chromate; good in dark shades top or bottom chrome.

EXHAUSTS: Well.

FASTNESS TO:

Acid: Moderate.
Alkali: Good when afterchromed; poor otherwise.
Carbonizing: Moderate.
Fulling: Good against white wool if afterchromed.
Ironing: Fast.
Light: Not as good as S-88.
Perspiration: Fast.
Potting: Better than S-88.
Rubbing: Fast.
Steaming: Fast.
Sulphur: Fast.
Washing: Same as S-88; bleeds off if not afterchromed
Finishing: Same as S-88.

SENSITIVE TO METALS, LIME: Copper makes the shade lighter and yellower.

MACHINE DYEING: Suitable.

OTHER PROPERTIES: Goes greener in shade on continued boiling. The dyed shade is very sensitive, especially to influence of gas.

DYED BY OTHER METHODS: This color dyes the fabric first an orange-red shade, the definite shade only being developed on boiling.

ON UNIONS: Chromate, the cotton is stained.

ON OTHER MATERIALS: No interest.

PRINTING: Prints very uneven, therefore is not recommended

DISCHARGING: Does not discharge with hydrosulphite.

COMPETING PRODUCTS: Made in the United States by Butterworth-Judson Corporation; Calco Chemical Company; E. I. du Pont de Nemours & Co.; American Aniline Products, Inc

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AZO EOSINE C
(Schultz No. 94)

COMPOSITION: Mono azo.

SPECIALLY SUITABLE FOR: Wool.

USUAL METHOD OF DYEING: Acid.

SHADE: Bluish red.

FASTNESS TO:
- **Acid:** Fast.
- **Alkali:** Fast.
- **Fulling:** Not at all fast.
- **Light:** Moderate.
- **Sulphur:** Fast.
- **Washing:** Moderate.

COMPETING PRODUCTS: Made in the United States by American Aniline Products, Inc., and Newport Chemical Works

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DIAMOND FLAVINE G
(Schultz No. 102)

COMPOSITION: Mono azo.

SPECIALLY SUITABLE FOR: Wool.

USUAL METHOD OF DYEING: Acid; chromate; top or bottom chrome.

SHADE: Yellow.

SOLUBILITY: Good.

FASTNESS TO:
- **Acid:** Fast.
- **Alkali:** Fast.
- **Fulling:** White cotton threads are stained.
- **Light:** Fast.
- **Sulphur:** Not at all fast.

COMPETING PRODUCTS: Made in the United States by United States Color & Chemical Company; Butterworth-Judson Corporation; E. I. du Pont de Nemours & Co.; Grasselli Chemical Company.

AUTOL RED RLP
(Schultz No. 106)

USUAL METHOD OF DYEING: Printed on cotton as a pigment color with albumen, gives a brownish red.

SHADE: Gives a bright claret when cotton padded with beta-naphthol is developed with alpha-napthylamine.

FASTNESS TO:
- **Acid:** Developed shade on cotton.
- **Alkali:** Fast.
- **Chlorine:** Fairly fast.
- **Fulling:** Fairly fast.
- **Ironing:** Fairly fast.
- **Light:** Stands fourteen days' exposure without change.
- **Rubbing:** Fairly fast.
- **Water:** Fairly fast.

OTHER PROPERTIES: Used in indigo discharge printing for the manufacture of lakes fast to water and lime.

PROPERTIES OF THE LAKE: Fast to water alkali and acids and soluble in oils and spirits. Of no interest for oil paints because this shade can be easily obtained with the cheaper peroxide of iron colors. No interest for printing inks.

COMPETING PRODUCTS: Made in the United States by Central Dyestuff & Chemical Company and American Aniline Products, Inc

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SULPHAMINE BROWN A
(Schultz No. 107)

COMPOSITION: Mono azo.

SPECIALLY SUITABLE FOR: Wool.

USUAL METHOD OF DYEING: Acid top chrome, chrome mordant or chromate. Best results when dyed top chrome.

SHADE: Yellowish brown; redder on a mordant.

SOLUBILITY: Good.

FASTNESS TO:
- **Acid:** Top chrome good.
- **Alkali:** Fair fastness.
- **Fulling:** Moderate; stains white.
- **Light:** Very moderate dyed direct; considerably faster dyed top chrome.
- **Potting:** Not fast.
- **Scouring:** Moderate dyed direct; top chrome better.
- **Washing:** Moderate dyed direct; faster dyed top or bottom chrome.

OTHER PROPERTIES: The fastness to light and milling is improved by aftertreating with copper sulphate, but the fastness to alkali is poorer.

ON OTHER MATERIALS: No interest.

COMPETING PRODUCTS: Made in the United States by Sherwin-Williams Company.

(Continued on page 339)

Practical Hints on the Production of Bright Colors on Textile Fabrics

Part IV

Better Utilization of Pastes—The Working of the Plant—Possible Modifications—A Compound Padding Machine—Its Mode of Working and Advantages—A Vertical Plant—Method of Using and Its Good Features—Another Type of Machine—Its Advantages

By RAFFAELE SANSONE

THE most suitable plant for the application of the padding baths described in the preceding section is constructed more or less on the principle shown in Fig. 3.

This shows a strong wooden trough (V), having a long upper and lower series of guiding rollers, and a long closed steam heating coil leading on one side to an introduction tap placed on the outside, and at the other to a steam trap which eliminates all condense water formed, preventing a waste of steam or any bumping that might follow.

The inside of vat V is lined with a thick coating of glass, and is so arranged that all bath can be run out through a discharge tap placed at its back, and leading to a collection tub placed in a hole in the floor of the mill and closed by a wooden cover. This tub can be raised after each discharge operation, being carried by an overhead arrangement to the color shop to be utilized in the preparation of some future bath or paste; another vessel is then introduced in its place.

To facilitate the introduction of the cloth the guiding rollers in trough V have, close to their ends, an incavated space, in which two cotton bands can be passed, before the machine is started, remaining throughout the process at an equal distance apart. The upper guiding rollers can be raised or lowered simultaneously to treat the cloth in a thoroughly submerged condition in the bath, or partly in the liquid and partly out of it, as may be required.

At the beginning of vat V is an entering mechanism (E), composed of a double iron frame, sustaining three or more lined, copper spreading rods of small diameter which liberate the material from all plaits or folds. At its end is a strong pair of squeeze rollers (S), the small end shafts of which turn in supports contained in a solid iron frame, being submitted to elastic pressure, produced by levers and weights (X).

Just above the squeeze rollers is mounted a long projecting frame (A), having at its end another pair of squeeze rollers, resting by their own weight upon one another, and turning through the same mechanism which works the rest of the machine. These deposit the material on to a small wooden table (T), where an operator plaits it down by hand in the form of pieces.

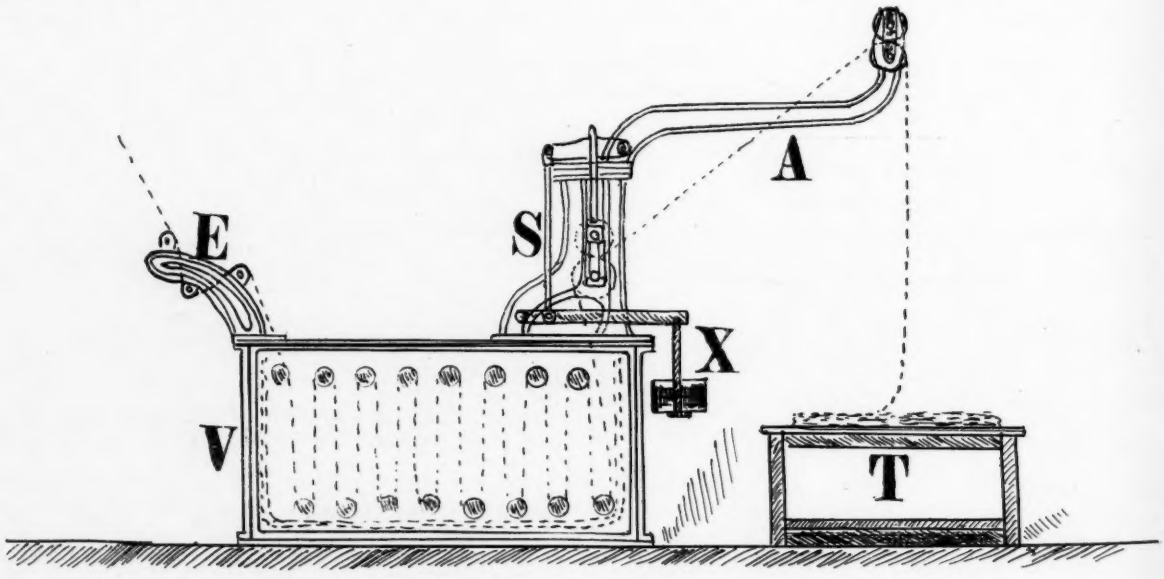

FIG. 3

The Working of the Plant

The working of the plant would be as follows: The operators aftering having cleaned the interior of vat V of all coloring matter, enter on the upper and lower guiding rollers two cotton tapes, causing these to pass also through the squeeze rollers S, and between the rollers on the delivering frame A.

The padding bath is then run into vat V, and warmed to the required temperature. The plant is started to introduce the first piece, the beginning of which has been sewn to the ends of the two cotton bands or tapes. The cotton cloth is thus introduced into the machine, and in passing over all guiding rollers is kept to its full width by the cotton bands, the ends of which remain always in the grooves of the rollers, preventing any folding over.

The guide rollers, the pressing cylinders and the rest of the machine turn very slowly, so that the cloth remains in the bath of treatment for some time, taking up much more color than is possible on many other forms of padding machines, where the cloth remains in the treating fluids only a short while. In this way much deeper shades are possible than in the first case. From time to time an operator enters at the end of vat V a certain quantity of fresh bath to replace what has been taken up by the material being treated.

On reaching the end of vat V, the fabric mounts between the squeeze rollers S, which press back the greater portion of the padding bath, and on reaching the rollers above frame A, it can be plaited to form pieces delivered later to a small wagon, ready for the drying and finishing department.

The production on the above machine is not large; it is, however, often sufficient for many purposes, especially when the mill can dispose of several plants, and dyes many different shades and colors on comparatively small batches of material.

Better Utilization of Pastes

Padding as conducted by the above plants and others in very general use is liable to future transformation owing to the greater need of reducing to the lowest limits the quantity of the coloring pastes employed for the treatment of cotton fabrics, at the same time avoiding all useless waste, and consequently the necessity of utilizing old baths.

So far with this scope the constructor has reduced the dimensions of the padding troughs, which have been given a special form, and in this way the quantity of bath left after the treatment of each batch is not so large. When, however, the padding operations have to be conducted on several machines simultaneously in the necessity of increased production, considerable bath is left which the dyer is always expected to utilize in the preparation of his new colors and pastes; this complicates his work and results in some loss of time. Moreover, when the old pastes, or baths, cannot be used at once it is necessary to store them away, and if fermentation goes too far they become useless.

For the above reasons the present dimensions of the padding troughs could be greatly reduced, and something further is required which will result in the utilization of the last drops of coloring bath so that the operatives have only to calculate the amount of bath according to the yardage of the goods treated. The determination of the quantity of the bath to be prepared per yard in such case can be made by the chemist in the laboratory, allowing a small quantity in excess to replace losses during distribution, application, etc.

Several modifications can be introduced to carry out the above suggestions. Fig. 4 shows the principle of a special form of compound padding machine where the cotton fabrics can be impregnated completely with but small quantities of padding bath (page 330).

This machine consists of a long solid iron frame (G), rising at a convenient height from the ground floor of the department of treatment, to which it is firmly fixed. This frame is furnished toward its upper portion with a long slot (S), lined with steel plate, in which repose the small end shafts of six copper drums (A, B, C, D, E, F), kept under a certain pressure through the two end screw wheels H and J.

In this way five nips are formed (a, b, c, d, e), in which the color paste for the padding is caused to drip automatically to keep the padding always with more or less the same quantity of paste, from an upper trough (T), drawn backward and forward at a regulation speed through a special mechanism, working a pair of endless chains (Z), on two end rollers (I and L).

At one side of the machine is an entrance frame (K), having several lined copper bars for removing from the fabric all plaits or folds, while at its back is a high projecting arm (Q), on which a folding appliance (P) distributes the padded cloth to a table in the form of pieces, or onto a small wagon, if this is more convenient.

For stopping the falling out of the padding pastes at both side of the copper drums A, B, C, D, E, F, two copper plates are placed pressing closely against their bases. As the treating pastes would be subject to a certain cooling when being delivered in trough T, and falling from this in the nips a, b, c, d, e, the six padding drums A, B, C, D, E, F are supplied with tubes which emit steam into their interior from the hollow end shafts at one side and deliver all condensed water at the other side.

The Working of the Plant

The work on the above plant would be conducted more or less as follows: The operators loosen the pressure on the copper drums (A, B, C, D, E, F) to keep them slightly apart, and introduce a thick endless cotton band or tape, causing it to run above drum

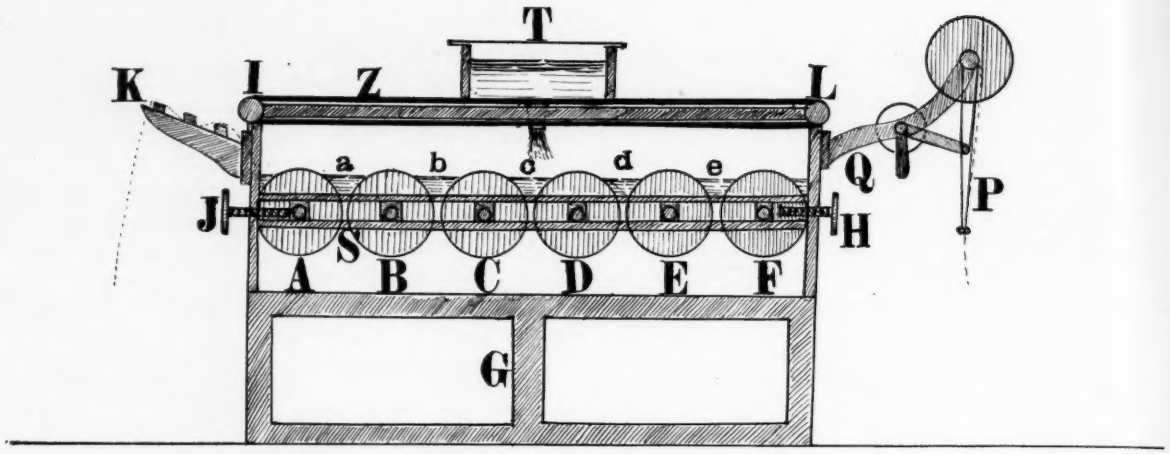

FIG. 4

A, below drum B, above drum C, below drum D, above drum E and below drum F, making its exit on the plaiting frame P. When this has been accomplished, the required pressure is applied on the drums by turning screw wheels H and J, and the beginning of the cotton fabrics to be treated is entered on the lined copper bars on K, sewing it to the end of the endless band just introduced.

After this a portion of the coloring bath which has been prepared in a kettle in the color shop is run into trough T, the steam in the tubes leading to the interior of the copper drums A, B, C, D, E, F is turned on, and the machine is started. Trough T thus moves backward and forward, filling the different nips a, b, c, d, e, while the cotton fabric is drawn forward above drum A, allowing the coloring paste to enter nip a, where all excess of this paste is pressed out by bowl B, by passing below this same bowl and mounting in nip b. Here the untouched portion of the cloth comes in contact with the bath of treatment by passing with a certain portion of this around drum C and entering the nip c, receiving there another lot of coloring paste by being pressed by drum D, mounting in nip d and passing from here to receive two lots of fresh bath, and being pressed for the last time by drum F, below which the material then mounts to make its exit on plaiter P and be delivered to the drying department in the form of pieces.

THE ADVANTAGES OF THE PLANT

The above plant, although it will seem of rather strange construction to all those accustomed to the ordinary padding machines, offers several advantages over the majority of these which are well worth considering. Some of these may be indicated as follows:

1. The cotton cloth, while passing around six pressure rollers, as it would on an ordinary six-bowl calender, is impregnated with five different baths of color paste, being pressed five times and treated on both sides.

2. Through the warming arrangement adopted, the material can be padded with boiling baths, baths at 90, 75 and 50 deg. Cent., or cold baths.

3. The copper drums B, D and F can be covered with a layer of India rubber to accomplish the pressing of the cotton fabrics as it would take place on several of the simple padding machines.

4. Should it be required to deliver the material quite dry and ready for the final calendering operations, saving time, labor and space, the drying can be conducted by adding, after drum F, another two or three drums heated like F by steam circulating in their interior.

5. The plant conducts the work of three or more padding machines with two bowls, avoiding all the intermediate manipulations necessary with several machines and using only one driving, heating and treating means.

6. Through supplying the machine with a convenient driving disposition, the speed of the turning of the copper drums can be increased or reduced at will to suit the different thicknesses of material being run through, and avoiding, in some cases, loss of time, while allowing in others a sufficient penetration.

7. Through the automatic feeding of the nips a, b, c, d, e with the coloring paste it is possible to use the last drop of paste in trough T, so that only what remains in the nips is wasted.

8. Should it be required to keep the paste in trough T warm, a suitably arranged closed steam-heating coil is used, working from a loose movable connection at the back of the plant, and which is carried backward and forward with trough T without interfering in any way with its movements.

9. Through the heating of drums A, B, C, D, E, F the material receives a special kind of finish, and if the size of these is sufficiently large more filling and color

(*Continued on page 336*)

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

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FEBRUARY MEETING, LOWELL TEXTILE JUNIOR SECTION

The February meeting of the Lowell Textile School Junior Section of the American Association of Textile Chemists and Colorists was held Friday afternoon, February 29, 1924, at 3 p. m., Chairman Feindel presiding.

After routine business the Chairman introduced Royal D. Little, who gave a very interesting talk on the subject of "Bleaching, Dyeing and Finishing of Acetate Silk," similar to the paper which he read at the third annual meeting of the Association and which was published in full in the January 14 issue of the American Dyestuff Reporter.

Following Mr. Little's talk an open discussion of the subject was held and many questions asked and answered.

At the conclusion of the discussion a rising vote of thanks was extended the speaker, whereupon the meeting adjourned.

Respectfully submitted,
G. Whitwell Pierce, Secretary-Treasurer.

QUESTIONNAIRE

The following questionnaire is being forwarded to every member of the Association, also a return stamped envelope. Remember that you cannot be considered a member in the best of standing if you do not fill this out to the best of your ability and return it. Some of these questions are absolutely necessary for the publication of an accurate Year Book, and even though you cannot answer all the questions, answer as many as you can and mail it to the Secretary as early as possible. If you have failed to receive your copy, answer the questions listed below on a separate sheet of paper and mail to W. E. Hadley, Secretary, 5 Mountain Avenue, Maplewood, N. J.

1. Name .....
2. Home address .....
3. Business address .....
4. Occupation or official designation.....
5. Check the headings in which you are specially interested: cotton, wool, silk, linen, artificial silk, union material.
6. Please read the list of suggestions for which prizes are offered as published in the last Year Book, and make suggestions for additional subjects.
7. What subjects can you suggest which you believe will be of general interest for presentation or discussion at our next annual meeting? Will you present a paper in regard to one of these subjects, and if so which one?
8. Give names of those whom you believe would be qualified to present a paper or speak in regard to the subjects you have mentioned.
9. Are there any special features in regard to the annual meeting you would suggest to make it of greater interest and value to the attending members? Look over the 1923 Year Book and suggest any ways in which it might be made of more value to the readers.
10. Make any suggestions you may have in mind in

regard to the general activities of the Association, including the work of the Research Committee.

The annual meeting will be held in Philadelphia probably the latter part of the first week in December.

APPLICANTS FOR MEMBERSHIP

Active Membership

Blaeser, P. R., boss dyer, Textile Dyeing Company, Inc., Paterson, N. J. Sponsors: J. S. Unterweiser and Giles Low.

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Franke, K. W., P. O. Box No. 148, University, Va.

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Hunt, Howard W., Union Fabric Company, Washington Street, Pawtucket, R. I.

Johnson, George H., Mellon Institute, Pittsburgh, Pa.

Kidd, Thomas E., 261 Summer Street, Stamford, Conn.

Sampson, A. E., City Club, Boston, Mass.

Shupp, A. F., Dr., American Laundry Institute, Joliet, Ill.

Sweigert, William F., 676 Valley Street, East Orange, N. J.

Worthen, Clifford T., McLaughlin Textile Corporation, Utica, N. Y.

ASSOCIATION BADGES

Those who attended the Annual Meeting of Providence had an opportunity to examine and purchase the new lapel button badges which were there distributed by the Secretary.

For the benefit of members who were unable to attend the meeting an illustration of the badge is shown herewith.

The three "rings" are enameled in red, yellow and blue, respectively, and the initials and border are brought out in gold. The general effect is exceedingly attractive.

Badges may be secured at $1.50 each by addressing the Secretary.

WALTER E. HADLEY,
5 Mountain Avenue,
Maplewood, N. J.

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

LOUIS A. OLNEY
PROFESSOR OF CHEMISTRY AND DYEING, LOWELL TEXTILE SCHOOL
Directing Editor

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GROUND FOR OPTIMISM

WHEN conditions are depressed, as they are at the present time in the textile industry, the optimist is sometimes hard-pressed to find material upon which to base his optimism. The pessimist, on the other hand, finds ample argument to support his position.

At the moment it is obvious that general trade is far below normal. The textile industry, in particular, is suffering from an acute dearth of buyers of finished products. Looking somewhat farther afield we find the spectacle of a Congress, theoretically composed of men of unusual ability chosen by their respective constituencies for marked legislative wisdom, busying itself with measures which, by no stretch of the imagination, can be considered beneficial to the nation as a whole—pensions, bonuses, emasculated tax revision—in short, a mass of special legislation designed to benefit a few special interests at the expense of national welfare and propagated in nearly every instance by the sponsors' desire to corral the votes of some special group.

With conditions of this type existing in the national legislature, it is at least encouraging to note the obvious sanity of the American populace as a whole and of the nation's chief executive in particular.

President Coolidge, by his official acts and utterances, has left no room for doubt as to his position on measures affecting the national welfare. His platform is unflinchingly "the greatest good of the greatest number." Uneconomic measures, such as the bonus and pension legislation, have received from him the opposition which they deserve. Substitutes for the wise and painstakingly prepared Mellon tax revision measure have received his unqualified disapproval.

Mr. Coolidge's opposition to such legislation in itself would not be so encouraging, however, were it not for the fact that he is apparently upheld in his views by a vast majority of the voters of the country. Without exception, the primary elections held to date have demonstrated unlooked-for Coolidge strength. Even in California, the home State of Senator Johnson, a leading radical candidate for Presidential honors, the native son was unable to secure a majority of his commonwealth's vote. In Wisconsin, La Follette, who has reigned as practical dictator for many years, suffered an unexpected loss of prestige. In the wheat belt—the heart of the farm bloc—Coolidge was in every case markedly successful, despite the fact that he is opposed to legislation which is theoretically designed to favor this element.

All in all, it appears to be an unquestioned fact that even in the strongholds of the so-called special interests there are enough clear-thinking, common-sense Americans to far outweigh the radical element.

From the above we deduce that there can be but one answer to the Presidential and Congressional elections to be held next November—a wise and courageous American is to be returned as the nation's Chief Executive and his policies will be reinforced by a Congressional delegation which espouses the broad cause of national welfare whenever it is threatened by the attacks of special groups of interests.

This is just foundation for optimism. Little may be expected, perhaps, in the way of constructive developments throughout the summer months; but, with the approach of the national elections and the crystallization of public sentiment in favor of a common-sense business administration, the industries of the country must take heart, with the result that the fall season will see us well on the way toward a general revival of national prosperity.

CORRESPONDENCE

THE following letter, written by Dr. Harrison E. Howe, editor of the Journal of Industrial and Engineering Chemistry and formerly an active officer in the National Research Council, is being published as further evidence of the need of more active co-operation in the field of Textile Research.

Professor L. A. Olney,
Lowell Textile School, Lowell, Mass.

Dear Professor Olney: I have read with much interest your editorial in the AMERICAN DYESTUFF REPORTER of April 7th entitled Co-operative Textile Research. As you may know, I spent a great deal of time with the textile industry while in the National Research Council in an effort to have them appreciate what research could do for the industry and the advantages of a co-operative program. A committee was organized following the World Cotton Conference in New Orleans. Some meetings were held and good work begun, only to find a discouraging absence of interest on the part of the textile people themselves. There seemed to be no appreciation of scientific work done in co-operation, and while our committee was always received courteously, research was applauded not for the hearer but as a good thing for the other fellow.

I almost reached the conclusion that the best thing would be to let a few of the textile plants feel the uncomfortable pinch of competition based on superior knowledge before the lesson would be learned and the point given serious consideration. In fact, I know of no group which I think Robert Kennedy Duncan's saying is more applicable than to the textile industry. You remember Duncan said: "During the next five years the small manufacturer who is swept out of existence will often wonder why. He will ascribe it to the economy of large-scale operations or business intrigues or what not, never knowing that his disaster was due to the application of pure science that the trust organizations and large manufacturers are already beginning to appreciate."

There are a few men in the textile industry who realize the possibilities. They are all too few and are so diluted by those who have inherited their businesses or who feel they have done pretty well without the assistance of science, as to make their efforts unfelt. Keep up your good work. We are entirely with you.

Sincerely Yours,

(Signed) H. E. Howe,

Editor, Industrial & Engineering Chemistry.

T. C.'S COLUMN

THE MODERN BABEL

ASSIGNING dye names must be one of the real problems of the dyestuff manufacturer, and the babel of them is certainly one of the trials of the dye user. Although we are prone to criticize, there are good reasons for the use of distinctive names by different manufacturers. We cannot blame them for wanting their products to stand out from the rest or for designing the names to have advertising or other sales value. From the users' point of view, however, the matter seems to have become very much overdone and instead of accepting them all with or without loud and prolonged silent "cussing" should we not make more audible protests, including suggestions for improvement?

The invention of fancy names for dyes seems to have become standard practice in all dye-making countries, but it is true that quite a number of the names really mean something.

Many have very interesting derivations. In reading on astronomy I came across a star, Algol, and at once thought of vat dyes. The identity of names may be but a strange coincidence, but it seems more than that; for Algol comes from El Ghoul, and means The Demon. It is a star that blinks, or gives an intermittent light, a sort of "now you see it, now you don't," so it may easily have been a source of inspiration in christening vat dyes.

On the other hand, there are plenty of names which have no very special meaning; and, including names of all sorts, there are far too many. We can picture the dye user, represented by the textile chemist, as looking at the matter in two ways. First, and most important, we need some system of standard dye designations. At the moment all references are to Schultz Farbstofftabellen, but a given edition of Schultz may not be an authority forever. Again, the numbers are not the same as in the new English Colour Index, which we certainly ought to recognize with its references to American dyes. The result is more than one authority with systems of numbers, but such numbers are only a temporary expedient unless provision is made to retain them from one edition to another and to insert new ones for new dyes. Our real need is for an international system of either names or numbers. Of the two the names seem more useful and just as practical, although there is nothing to hinder, and there would be advantages in also having an expansible set of numbers.

In the second place, when we approach the subject of new or simplified dye names for everyday use, the problem becomes complicated by sales policies and psychology, and is very much more difficult.

To illustrate some of the psychology, I presume that if we wrote to any dyestuff dealer for Direct Blue 2B he would fill our order and in most cases mark the package Direct Blue 2B, even though his stock might be designated something like Phenomenal Cotton Blue BC Extra or any of the dozen or two current names for this common product. I have seen this work more than once; the dealer wants to be sure that we think we are getting what we asked for.

The real object of this illustration was to bring out the point that some dye names are already familiar to everybody, although not by any means always used. The corresponding colors are put up in strengths that are a fairly definite standard and can be supplied readily from various sources.

On the other hand, if the customer were to try to order Phenomenal Cotton Blue BC Extra there might be but one company in the world that would know what he meant. Any of them could find out readily enough; but time is required to procure and test a sample and, in spite of any and all argument to the contrary, the extra work entails an expense that finally gets passed back to the customer.

While the Direct Blue 2B can be easily purchased, it is not actually quite as simple as it sounds, because the Blues 2B will vary in redness, greenness or brightness, although essentially the same, and some tests may be necessary. However, when such a dye is once tested and characterized and written with the manufacturer's name after it (assuming that he is on the job and makes it all alike) its status is settled and the name means something. What can be more definite

or a better guarantee of quality than Direct Blue 2B John Doe & Co.?

To ask the dyestuff manufacturers to suddenly adopt a new set of dye names would be manifestly unfair and unreasonable. To expect them to voluntarily collaborate to devise a simpler system would be foolish, because there would be such a host of small conflicting interests. It seems to remain for some outside neutral party.

It is a task for textile chemists, for who else can so well appreciate the value of having for each type of dye a single name, coupled with that of the manufacturer, to stand for any advantage in solubility, tone or strength peculiar to his individual product? So the only solution therefore seems to be for the chemists interested in using dyes to work out a system covering all commercial products, using simple descriptive names with letters to indicate the color tone where necessary, outstanding fastness properties where desirable, and the general method of dyeing.

Direct Blue 2B is ample for that dye, an ordinary direct color of the 2B degree of blueness.

Direct Fast Scarlet 4BA is a satisfactory name for a direct red of the 4B tone that is unusually fast to acid. It is better than the hybrid 4BS, which was translated into English but left with S the initial of a German word.

It is a little difficult to point out objectionable names and still appear impartial, because so many of them indicate at once the manufacturer. You can think of plenty of them, names that give no hint of the kind of dye or that contain no indication of its color.

The problem is principally one of selection. It would not seem wise to drop some of the old standbys like Chrysophenine, and most of the good names in use could be retained with but slight modifications to make them fit into a system. So far as possible leave the fancy names to the Color Card Association.

We could talk all day on dye names, but briefly our suggestion is to select, and, where necessary, to invent, a logical series and see how it looks. If satisfactory, it could then be adopted as a standard of reference and, where practical, brought into everyday use. We can even conceive of color companies converting themselves to it and adopting it in the trade.

Like all innovations, such a project would not seem necessary to many and would meet opposition or passive resistance in some quarters; but nobody has real ground to criticize the idea of creating a more definite standard of reference. Its adoption for everyday use in the trade will depend entirely on its merits.

Dyehouse workers in the Greenpoint section of Brooklyn, N. Y., went on strike May 9th for a $5 weekly increase in wages. About 800 men are out. The chief plants affected, which are under police protection, include Manhattan Dye Works, 250 Green Street; Franklin Dye Company, 208 Dupont Avenue.

GERMAN-AMERICAN COMMERCE BOARD ESTABLISHED

The Board of Trade for German-American Commerce, Inc., has been organized for the purpose of reestablishing and furthering commercial relations between the United States and Germany.

This association will be the central body for the exchange of information in all matters pertaining to trade, industry and finance; for the widening of existing and the opening of new markets; for aid in facilitating customs and tariff matters; for arbitration of commercial disputes; for rendering assistance in all questions which tend to promote and widen friendly commercial relations between the two countries.

The organization is being extended to comprise the entire United States, with branches in all important centers. It will be in close co-operation with the existing chambers of commerce and similar organizations throughout the United States and Germany, and will be of great value not only to the respective business communities but also to its members, to whom information and other facilities will be available.

The officers and board of directors include the following business executives:

Officers: Jarvis W. Mason, president; Eugene Hennigson, vice-president; C. F. Koth, treasurer; Henry C. Steneck, assistant treasurer; Robert C. Mayer, secretary.

Board of Directors: M. S. Bausch, manager foreign department, the Equitable Trust Company; Carl M. Bernegau, vice-president Keuffel & Esser; Hubert Cillis, chairman Guardian Life Insurance Company; Karl Eilers; August Eimer, president Eimer & Amend; C. Ermelbauer, Stoehr & Sons, Inc.; Dr. K. G. Frank, Siemens-Rhein-Elbe-Schuckert Union; Henry Heide, president Henry Heide, Inc.; Eugene Hennigson, president E. Hennigson Company, Inc.; Hans Hinrichs, president Hans Hinrichs Chemical Corporation; H. Hollesen, president H. Hollesen, Inc.; E. G. Hothorn, president Hothorn Litzrodt Corporation; Hermann Irion, general manager Steinway & Sons; C. F. Koth, vice-president and manager foreign department, Harriman National Bank; Paul G. Leoni, president Iron & Ore Corporation of America; Jarvis W. Mason, vice-president American Surety Company of New York; Robert C. Mayer, Robert C. Mayer & Co.; Herman A. Metz, president H. A. Metz & Co., Inc.; Julius P. Meyer, Hamburg-American Line; C. F. Rutgers, C. F. Rutgers & Co.; Dr. Emil Schill; Richard C. Schilling, president American Mercedes Company, Inc.; Henry Schuengel, North German Lloyd; Henry C. Steneck, vice-president Steneck Trust Company; A. F. Stoeger; Max W. Stoehr, chairman Botany Worsted Mills; E. Wedemann, president Wedemann, Godknecht & Lally, Inc.; Arthur Wiener, president Atlantic Book & Art Corporation, honorary representative Leipzig Fair; Felix F. Wiener, president Amolex.

Inc.; W. L. Wirbelauer, president Royal Piece Dye Works, Inc.

The board solicits applications for membership from responsible firms and individuals interested in the furthering of trade and the strengthening of business relations between the United States and Germany. Complete information may be obtained by addressing Board of Trade for German-American Commerce, Inc., 60 Broadway, Suite 507, New York City.

PRACTICAL HINTS ON THE PRODUCTION OF BRIGHT COLORS ON TEXTILE FABRICS

(*Continued from page* 329)

are incorporated in the material than with three and even four ordinary two-bowl padding machines.

10. Should it be required, below drums A, C, E could be placed friction rollers for imparting a special finish to the goods.

A Vertical Plant

Where space is a factor of vital importance to be considered, the above plant could be substituted by another constructed as indicated in Fig. 5.

This shows a high iron frame (F), bearing four pairs of rollers placed apart from one another, indicated in the sketch by R, S, T, U. Such pairs of rollers form four distinct nips (a, b, c, d), where the coloring paste is distributed as shown in Fig. 6. The pairs of bowls R, S, T, U slide in horizontally placed slots, where screw wheels keep them under the required pressure.

Frame F is of special shape and of very heavy construction, as it has to support much hard work. It has at one side an entrance arrangement (M) for the cloth (C), which also supplies it with a certain tension, eliminating all plaits that have escaped the attention of the attendant working the machine. At its back is placed an ordinary piece-forming mechanism placed on a projecting arm, and constittued principally of a moving frame D, moved backward and forward for a regulated interval by a wheel (V) and an iron rod.

In order to permit the production of new special padded effects, the plant is so arranged that both bowls can be turned simultaneously at the same or at different speeds, creating when desired a certain friction against the material. Besides this, the pressure bowls R, S, T, U can be given a special backward and forward movement on their axes so as to submit the cotton cloth (C) to a better penetration with the filling and coloring pastes.

Also in this instance, to avoid the falling out of the color paste from the ends of the nips a, b, c, d, the four pressure bowls R, S, T, U have pressing against their ends two copper plates. The warming of the bowls is conducted also in this instance through steam entering at one side and free of its condensed water at the other extremity.

Fig. 6 gives a front view of the above plant, where only one cylinder of each pair indicated by R, S, T, U is visible. The trough Z charging the coloring paste in each nip is moved automatically up and down through a special mechanism, working on M and connected with the rest of the plant. This, besides raising and lowering trough Z at the correct moment, also opens and closes a tap placed toward its bottom to allow the passage of a fixed quantity of coloring bath. During the charging movement the trough is occasionally advanced a small interval by the mechanism itself to allow its tap to remain conveniently placed for the discharging operations.

The Working of the Plant

The work on the above plant would require at first some training, not being as simple as that on most of the ordinary padding machines. A way of working it would be as follows: The operators, after having cleaned the pressing rollers R, S, T, U from preceding padding operations, enter the beginning of the first cotton fabric to be colored on disposition M and carry this upward so that it remains just between the nip of the first pair of pressure rollers (R). They then enter the warm coloring paste in trough Z, turn on steam in the pressure bowls R, S, T, U, and start the machine.

This causes the trough to charge all nips a, b, c, d with the coloring paste. The first pair of pressing rollers (R) then pulls through the cloth entered in its nip, which falls downward and is taken into the nip b just below, receiving a second lot of coloring paste and falling in nip c to receive a third charge of coloring paste and in nip d for a fourth, and passing downward, where the operators lead it upward onto the plaiting frame D.

The cloth then runs continuously from nip to nip, forming a straight vertical line, and is treated quite uniformly with the coloring paste. During this the trough delivering the coloring medium continues its movement up and down, keeping all nips well replenished. The operators fill it with fresh bath when necessary, until nearing the end of the last piece being treated, when its charge of color is allowed to exhaust, the machine continuing the padding only with what is present in the four nips a, b, c, d. Toward the end of the treatment steam is turned off.

The Advantages of the Plant

The advantages of the above plant can be enumerated as follows:

1. Through careful working no cotton band or tape need be introduced in the plant before the entrance of the cotton cloth goods, as the latter are carried through by its own means.

2. The cloth is given four impregnations with the

same coloring bath in one run, without receiving any intermediate passages on guiding rollers.

3. The color can be changed without stopping the machine, by stitching the beginning of a waste piece to the end of the last piece being entered, and to the end of the waste piece the beginning of the first piece

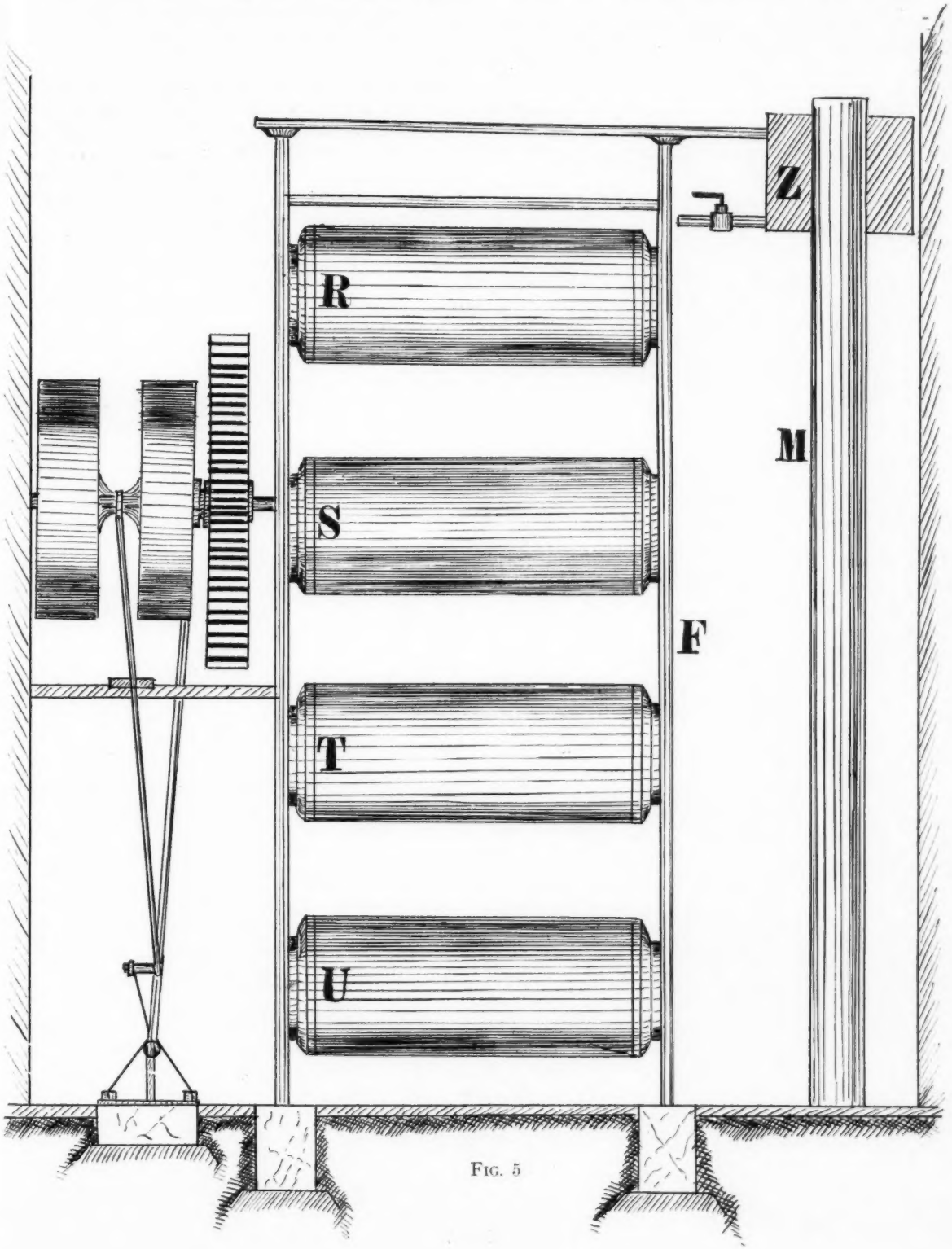


FIG. 5

of the new batch to be treated. In this way the waste fabric on passing through the different nips exhausts their baths, and if the dyer stops the motion of trough Z and cleans this, supplying it with the fresh color, by the time the end of the waste piece has been reached he can start the mechanism of the trough again to feed the four nips a, b, c, d and begin the treatment of the new lot of goods.

4. Because it is possible to give the pressure bowls

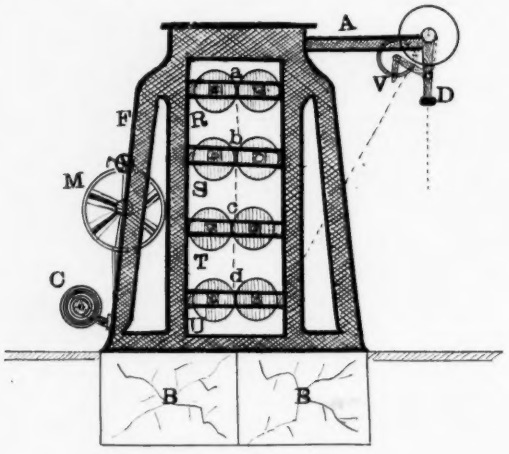


FIG. 6

a backward and forward rolling motion, the filling and coloring matter can be caused to penetrate better in the thickest fabrics, avoiding the necessity of a second passage through the machine.

5. It is possible to turn one of the rollers of each pair (R, S, T, U) quicker than the other; the material, therefore, can be treated as on the frictioning mangle, giving to it a special finish.

6. Should it be required to conduct the drying of the material before it makes its exit from the machine, by a suitable arrangement of guiding rollers the cloth can be made to mount, passing as much as possible against the heated surfaces of the different pressure rollers.

ANOTHER TYPE OF MACHINE

The above machine could be substituted in some cases by another special form of padding machine, constructed as shown in Fig. 7.

This shows a light iron frame forming a sort of table (T) supporting an iron, glass-lined, double-walled trough supplied with a tap for entering steam in the enclosed space and with a tap for expelling all condensed water formed. The lower portion of this trough is slightly inclined so that all bath can make its way during the emptying-out operations through a large tap.

For the pressing of the cloth, seven copper rollers (a, b, c, d, e, f, g) can be lowered in the trough, being kept under a regulated pressure against the bottom of the same, by upper hand wheels (s, s....). The pressure rollers do not reach the ends of the trough, and the bath therein can always occupy a certain height in the trough, which is slightly higher, however, at its end. For pressing out all excess of coloring paste from the material a pair of India rubber squeeze rollers (S) are placed at the end of the trough, which then deliver the cloth to a plaiting arrangement (P) that distributes the padded cloth onto a low table (V), ready for carrying to the drying department. Before the machine is placed a small frame (C) for the entrance of the cloth from a low table (X). This frame has three lined copper bars and a small introduction roller. The plant is driven from a lower pulley (J) by a leather belt working on an upper transmission.

THE WORKING OF THE PLANT

The working of the plant indicated above also requires practice if it is to be conducted to the best advantage. The operators, after having cleaned thoroughly all pressing rollers and the trough, enter two strings, causing these to pass below the rollers a, b, c, d, e, f, g and between the pair of pressing cylinders (S). When this has been done, they tie to the end of the strings the beginning of the cloth to be treated and run the coloring bath into the trough, bringing this to a certain height. They then enter steam between the two walls of the tdough to bring them to the desired temperature and start the plant.

The cotton cloth is thus drawn through quite evenly,

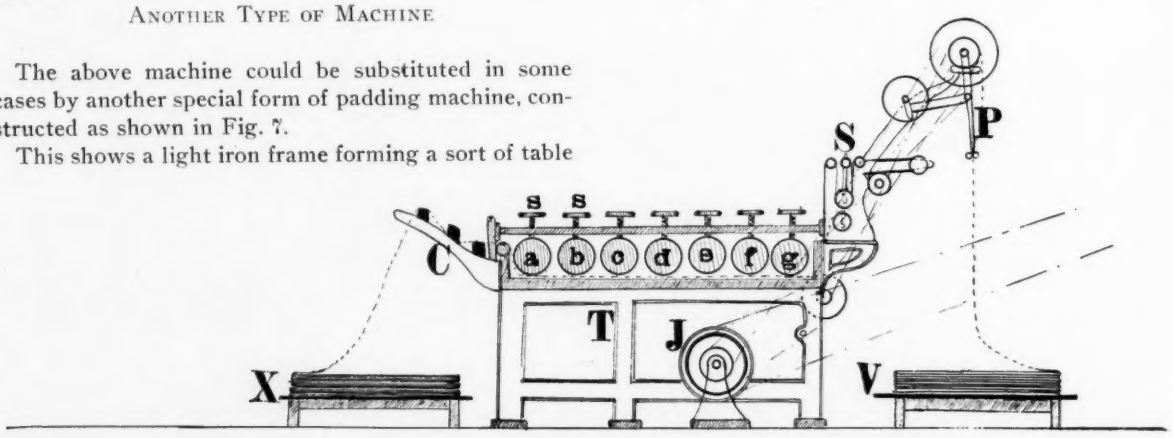


FIG. 7

especially if the precaution has been taken to keep the two strings as far apart from one another as possible, and passes under one after the other of the pressing rollers a, b, c, d, e, f, g, being more and more impregnated with the coloring and filling bath, until, reaching the pair of squeezing rollers (S), which press out all excess of bath, it is later drawn to the plaiting arrangement (P) by the strings, continuing its passage piece after piece through the bath.

The bath is kept always at the same height through continual additions, until nearing the end of the treatment of the goods, when the bath is allowed to go as low as possible without lowering in any way the amount of paste fixed. Once finished the treatment, all rollers (a, b, c, d, e, f, g) are withdrawn from the trough and are carefully cleaned, as is also the trough itself; the paste left in it is collected for use in the color room.

The Advantages of the Plant

The advantages of the above plant, which are well worth considering, are as follows:

1. Although impregnating and pressing the cotton goods seven times, no movement of the trough containing the coloring and filling bath is required.

2. The coloring bath, because of the space left around the pressing rollers a, b, c, d, e, f, g, circulates all through the plant, filling it always in the same way.

3. Through the special disposition given to the driving mechanism, the pressing rollers a, b, c, d, e, f, g can all be given the same speed or different speeds, subjecting the cotton material, if necessary, to a certain amount of friction.

4. Because of the seven impregnations and pressings the treatment is so thorough that in some cases it can be conducted at a very great speed.

5. Through the special construction of the plant and because of a slight rise in the bottom of the trough on the outside of the pressing rollers a, b, c, d, e, f, g, the bath always falls against them, permitting a full treatment with comparatively little bath.

6. The space occupied by the plant is small, while the work done is often that of three or more of the usual two-roller padding machines.

(To be continued)

DYESTUFF TABLES

(Concluded from page 327)

PALATINE RED A
(Schultz No. 109)

COMPOSITION: Mono azo.

SPECIALLY SUITABLE FOR: Wool.

USUAL METHOD OF DYEING: Glauber salt and sulphuric at the boil.

SHADE: Bluish red.

SHADE BY GASLIGHT: No change in shade.

SOLUBILITY: Good.

LEVEL: Not very good, though suitable as a self-color.

EXHAUSTS: Well.

FASTNESS TO:
- **Acid:** Good.
- **Alkali:** Fast on wool; on cotton turns yellow.
- **Carbonizing:** Fast.
- **Fulling:** Not fast; color bleeds and shade changes.
- **Ironing:** Fairly good.
- **Light:** Stands fourteen days without much change of shade.
- **Potting:** Not fast.
- **Rubbing:** Fast.
- **Steaming:** Fairly fast; shade goes off some.
- **Sulphur:** Fast.
- **Washing:** Not fast on cotton.
- **Water:** Bleeds.

OTHER PROPERTIES: Not recommended especially for piece dyeing, as the penetration is not good enough for this class of work.

DYED BY OTHER METHODS: Acetic acid assists penetration more than sulphuric, but dyed with acetic the shade is not full and is much bluer.

ON UNIONS: On cotton-wool unions the cotton remains white.

ON OTHER MATERIALS: Dyed on silk in a bath of boiled-off liquor broken with sulphuric acid, the silk is hardly colored. A full shade, however, is obtained by dyeing with sulphuric acid without soap. On gloria the wool is dyed a fuller shade than the silk, which is also slightly bluer.

PRINTING: Suitable for wool printing.

DISCHARGING: The shade discharges white with tin crystals or zinc dust.

COMPETING PRODUCTS: Made in the United States by Sherwin-Williams Company.

CORRECTION

In the list of dyestuff tables published in our issue of May 5, under the headings Amido Naphthol Red 6B, Schultz No. 66; Brilliant Orange O, Schultz No. 70; Xylidine Orange 2R, Schultz No. 79; Ponceau 2R, Schultz No. 82, the name of American Aniline Products, Inc., was omitted as a manufacturer under these four products. Records should be corrected accordingly.

The American Chemical Society has elected Brig.-Gen. Amos A. Fries, Chief of the Chemical Warfare Service, and Francis P. Garvan, president of the Chemical Foundation, to honorary membership in the Chemists' Club of New York. Only ten other names are on the club's honor roll. Of these, two are British and two are French.

A. E. Hofer, Eugene Suter & Co., New York, sailed Wednesday, May 14th, for a two months' business trip to Europe.

Foreign Dyes Imported Through the Port of New York During April

Compiled by the Chemical Division of the Bureau of Foreign and Domestic Commerce, in Collaboration with the Chemical Division of the United States Tariff Commission

KEY TO ABBREVIATIONS FOR FOREIGN MANUFACTURERS

1—The Six Leading German Companies

A—Actien-Gesellschaft fur Anilin-Fabrikation, Berlin. Founded 1873. Branches in France and Russia.

B—Badische Anilin-und Soda-Fabrik, Ludwigshafen on the Rhine. Founded 1865. Branches in France and Russia.

By—Farbenfabriken vorm. Friedr. Bayer & Co., Leverkusen on the Rhine. Founded 1862. Branches in France and Russia.

C—Leopold Cassella & Co., Frankfort on the Main. Founded 1870. Branches in France and Russia.

K—Kalle & Co., A. G., Biebrich on the Rhine. Founded 1870. Branches in Russia.

M—Farbwerke vorm. Meister Lucius & Bruning, Hochst on the Main. Founded 1862. Branches in France and Russia.

2—The Seven Smaller German Companies

BK—Leipziger Anilinfabrik Beyer & Kegel, Furstenberg near Leipzig. Founded 1882.

GG—Chemikalienwerk Greishem G.m.b.H., Griesheim on the Main. Founded 1881.

CJ—Carl Jager G.m.b.H., Anilinfarbenfabrik, Dusseldorf. Founded 1823.

GrE—Chemische Fabrik Griesheim-Electron, Offenbach on the Main. Founded 1842.

L—Farbwerk Muhlheim vorm. A. Leonhardt & Co., Muhlheim on the Main. Founded 1879. Branch in France.

tM—Chemische Fabriken vorm. Weiler ter Meer, Uerdingen on the Rhine. Founded 1877.

WD—Wulfing, Dahl & Co., A. G. Barmen. Founded 1842.

3—Dutch, Belgian and French Companies

FA—Farbwerk Ammersfoort, Ammersfoort, Netherlands. Founded 1888.

NF—Niederlandische Farbe-und Chemikalienfabrik Delft, Netherlands (Delft). Founded 1897. Branch in Russia.

LG—Lazard Godchaux. of Brussels. (These products are probably compounded largely from the dyes made by A. Wiescher & Co., of Haeren, Belgium.)

P—Societe Anonyme des Matieres colorantes et produits chimiques St. Denis (formerly A. Poirrier), St. Denis, near Paris, France. Founded 1830.

4—Swiss Companies (all at Basel)

DH—Farbwerke vorm. L. Durand, Huguenin & Co. Founded 1871. Branches in Germany and France.

G—Anilinfarben-und Extract-Fabriken vorm. Joh. Rud. Geigy. Founded 1764. Branches in France, Germany and Russia.

I—Geselfschaft fur chemische Industrie. Founded 1885. Branch in France.

S—Chemische Fabrik vorm. Sandoz & Co. Founded 1887.

5—English Companies

BAC—The British Alizarin Co., Ltd. Established 1882.

ClCo—The Clayton Aniline Co., Ltd., Clayton, near Manchester Founded 1876.

CR—Clauss & Co. (formerly Clauss & Ree), Clayton, near Manchester. Founded 1890.

CV—Colne Vale Chemical Co., Milnsbridge, near Huddersfield.

RHS—Read Holliday & Sons, Ltd., Huddersfield. Founded 1820. (Purchases by British Dyes, Ltd.)

BD—British Dyes, Ltd Founded 1915.

Lev—Levinstein, Ltd., Crumpsall Vale, near Manchester. Founded 1864.

Q—Importations of unknown source, through dealers in colors.

THE imports of coal-tar dyes for April, 1924, through the port of New York totaled 174,880 pounds, with an invoice value of $182,253. In addition, 1,670 pounds, valued at $1,536, were reported through the port of Boston.

Imports of Dyes Through the Port of New York 1924

Month	Pounds	Value
January	228,743	$232,571
February	158,874	176,657
March	293,862	302,016
April	174,880	182,253

Dyes—Per Cent of Quantity by Countries of Shipment, 1924

	Jan.	Feb.	March	April
Germany	41	44	63	49
Switzerland	32	35	15	23
Italy	6	8	6	13
Belgium	8	4	3	..
England	5	3	6	6
Canada	3	1	..	..
France	3	2	2	5
Holland	..	..	4	3
All others	2	3	1	1

Five Leading Dyes by Quantity Imported During April

Algol Brown R	18,702	pounds
Fast Green	7,059	"
Algol Blue 3G	5,804	"
Alizarine Blue Black	5,673	"
Palatine Black	5,000	"

The dyes in this report are grouped by Schultz numbers, and in the case of those which could not be identified by Schultz number the classification according to the ordinary method of application was adopted. As the pastes and powders of the vat dyes vary widely in strength and quantity, each vat dye has been reduced —in nearly every case—to a single-strength basis.

The designation of "†" for competitive and "*" for non-competitive indicates the appraisement basis for the assessment of the ad valorem duty in paragraph 28 of the Tariff Act of 1922. Those dyes without designation are doubtful, pending further investigation.

Dyes of Coal-Tar Origin

(This table includes imports through the port of New York to the amount of 174,880 pounds, and also 1,670 pounds from Boston.)

No. Schult:	Name of Dye and Manufacturer	Quantity (pounds)
81	Brilliant Cochineal	50
	Brilliant Cochineal 4R—(C)	
88	Acid Anthracene Brown	397
	*Acid Anthracene Brown PG—(By)	
121	Erica B	200
	Erica B Conc.—(S)	
140	Curcumeine	441
	*Chromocitronine R—(S)	
220	Palatine Black	5,000
	Wool Black GRF—(A)	
272	Brilliant Black	25
	Naphthol Black BGN Conc.—(C)	
273	Diaminogene Blue	2,832
	*Diaminogene Blue NA—(C)	
	Diazanil Blue BB—(M)	
	*Blue NA—(C)	
274	Diaminogene	1,000
	Black BR—(By)	
296	Cotton Yellow	500
	Benzo Fast Yellow RL—(By)	
319	Diamine Scarlet	500
	Diamine Scarlet 3B—(C)	
339	Brilliant Orange	3,400
	Diamine Orange B—(C)	
358	Diphenyl Red	665
	*Chloramine Red 8BS—(By)	
	*Toluylene Red—(Gr.E)	
373	Congo Orange	200
	Congo Orange R—(A)	
392	Toluylene Orange	4,563
	*Direct Fast Orange K—(I)	
	Pyrazol Orange G Conc.—(S)	
400	Acid Anthracene Red	10
	Acid Anthracene Red 3B—(By)	
418	Diamine Brilliant Blue G—(C)	50
449	Trisulphon Brown	4,685
	Trisulphon Brown B Conc.—(S)	
496	Setoglaucine	551
	Setoglaucine 753—(G)	
500	Setocyanine	441
	Setopaline Conc.—(G)	
505	Light Green (Yellowish)	112
	Acid Green G Powder—(Gr.E)	
523	Fast Green	7,059
	*Fast Green Extra Bluish—(By)	
537	Methyl Blue for Silk	3,307
	Methyl Lyons Blue—(G)	
543	Patent Blue	1,724
	†Patent Blue V—(M)	
	Patent Blue V—(Q)	
545	Patent Blue A	875
	*Brilliant Acid Blue FF—(By)	
	Neptune Blue BR—(M)	
546	Cyanol	236
	*Cyanol FF—(C)	
549	Chrome Violet	110
	Brilliant Chrome Violet 4B—(DH)	
562	Fast Acid Blue	540
	*Brilliant Wool Blue FFR Extra—(By)	
571	Rhodamine 6G	1,352
	Rhodamine 6GDN Extra—(B)	
	*Rosazeine 6G Extra—(M)	
579	Xylene Red	5
	Sulpho Rosazeine B Extra—(Q)	
606	Phosphine	2,500
	†Coriphosphine OX Extra—(By)	
	Phosphine 3R—(A)	
612	Chinoline Yellow (spirit soluble)	22
	Chinoline Yellow—(By)	
618	Thioflavine T	220
	Rhoduline Yellow T—(By)	
624	Modern Violet N	110
	Modern Violet N Extra—(DH)	
625	Chrome Heliotrope	110
	*Modern Heliotrope—(DH)	
635	Modern Violet	220
	*Modern Violet—(DH)	
645	Gallazine	220
	*Gallazine No. 90—(DH)	
673	Azo Carmine B	300
	Rosinduline 2B Bluish—(K)	
705	Indamine 6R	200
	Indocyanine B—(A)	
734	Pyrogene Yellow	220
	Pyrogene Yellow M—(I)	
759	Anthraflavone G Paste	2,218
	Anthraflavone GC Paste—(B)	
760	Indan. Golden Orange G (sgle. stngth.)	4,255
	Vat Golden Orange G Paste—(B)	
	Vat Golden Orange G Dbl. Pst.—(B)	
	*Vat Golden Orange G Powder—(B)	
	*Duranthrene Golden Orange Y Paste—(BD)	
761	Indan. Golden Orange R (sgle. stngth.)	3,615
	Helindone Golden Orange IRRT Paste—(M)	
	Vat Golden Orange RRT Paste—(B)	
	Vat Golden Orange RRT Pdr.—(B)	
763	Indanthrene Dark Blue Paste	508
	Indanthrene Dark Blue BO—(B)	
765	Indanthrene Green B (sgle. stngth.)	414
	Indan. Black BB Dbl. Pst.—(B)	
779	Alizarine Orange	3,934
	†Alizarine Orange AO Paste—(BAC)	
782	Alizarine Brown	2,535
	*Anthracene Brown RD Paste—(G)	
785	Alizarine RG, GI	2,286
	†Alizarine Red YCA Paste—(BAC)	
792	Cibanone Orange	1,543
	Cibanone Green G Paste—(I)	
795	Cibanone Yellow R (sgle. stngth.)	2,860
	Cibanone Yellow R Powder—(I)	
804	Alizarine Blue S	662
	*Alizarine Blue S Powder—(By)	

Schultz No.	Name of Dye and Manufacturer	Quantity (pounds)
808	Alizarine Green	329
	Alizarine Green S Paste—(B)	
815	Algol Scarlet G	25
	Vat Scarlet G Paste—(By)	
819	Algol Red FF, R (sgle. stngth.)	3,032
	Algol Red FF Extra Powder—(By)	
	*Algol Red R Extra Powder—(By)	
820	Algol Brilliant Violet R (sgle. stngth.)	1,296
	Algol Brilliant Violet R Powder—(By)	
821	Algol Brilliant Violet 2B (sgle. stngth.)	800
	Vat Brilliant Violet BBK Pdr.—(By)	
822	Algol Brilliant Orange FR (sgle. stngth.)	1,039
	Vat Orange RRK Paste—(B)	
828	Indanthrene Bordeaux B (sgle. stngth.)	296
	Indanthrene Bordeaux B Pdr.—(B)	
830	Indanthrene Red R	154
	Vat Red R Paste—(B)	
831	Indanthrene Red BN (sgle. stngth.)	1,772
	Indanthrene Red BN Ex. Pst.—(B)	
	Indanthrene Red BN Ex. Pdr.—(B)	
	Vat Red RK Paste—(B)	
	Vat Red RK Powder—(B)	
833	Algol Olive R (sgle. stngth.)	3,368
	Vat Olive R Powder—(By)	
838	Indanthrene Blue RS (sgle. stngth.)	2,618
	Indanthrene Blue RS Paste—(B)	
	Indanthrene Blue RS Dbl. Pst.—(B)	
	Indanthrene Blue RS Triple Pdr.—(B)	
840	Indanthrene Blue 3G (sgle. stngth.)	550
	Indanthrene Blue 3G Powder—(B)	
844	Algol Blue 3G (sgle. stngth.)	5,804
	Algol Blue 3G Powder—(By)	
	Vat Blue 5G Powder—(By)	
	Vat Blue 3GP Paste—(By)	
849	Indanthrene Yellow G (sgle. stngth.)	1,800
	†Helindone Yellow G Dbl. Pst.—(M)	
	†Vat Yellow G Dbl. Pst.—(B)	
852	Alizarine Irisol D, R	510
	*Alizarine Irisol R Powder—(By)	
855	Alizarine Pure Blue B	110
	Alizarine Sky Blue B Powder—(By)	
856	Alizarine Astrol	1,576
	Alizarine Astrol B Powder—(By)	
	*Alizarine Blue AS Powder—(By)	
858	Alizarine Saphirol B	100
	†Alizarine Light Blue SE Conc.—(S)	
860	Cyananthrol G	725
	Cyananthrol BGAOO—(B)	
	Alizarine Direct Blue BGAOO—(B)	
862	Alizarine Blue Black	5,673
	†Alizarine Blue Black B Powder—(By)	
864	Anthraquinone Green GXNO	375
	*Anthraquinone Gn. GXNO Pdr.—(B)	
865	Alizarine Direct Green G	1,485
	†Aliz. Cyanine Green G Ex. Pdr.—(By)	
869	Algol Brown R (sgle. stngth.)	18,702
	Algol Brown R Paste—(By)	
	*Vat Brown R Paste—(By)	
	Vat Brown R Powder—(By)	
870	Algol Corinth R (sgle. stngth.)	649
	Algol Corinth R Powder—(By)	
	Vat Corinth R Paste	
885	Brilliant Indigo BD	1,237
	* Brilliant Indigo B Paste—(B)	
895	Alizarine Indigo 3R	1,794
	Alizarine Indigo 3R Paste—(By)	
904	Helindone Brown G (sgle. stngth.)	110
	Thio indigo Brown G Powder—(K)	
906	Thio Indigo Scarlet G	1,102
	Ciba Red G Paste—(I)	
907	Ciba Scarlet	588
	Helindone Fast Scarlet G Paste—(M)	
	Thio Indigo Scarlet 2G Paste—(K)	
911	Ciba Orange G	551
	*Ciba Orange G Paste—(I)	
912	Thio Indigo Red B (sgle. stngth.)	1,850
	Ciba Pink BG Paste—(I)	
	Ciba Pink BG Powder—(I)	
913	Helindone Orange R	231
	Helindone Orange R Paste—(M)	
	Thio Indigo Orange R Paste—(K)	
915	Helindone Fast Scarlet R (sgle. stngth.)	2,250
	Helindone Fast Scarlet R Pdr.—(M)	
918	Helindone Red 3B	1,556
	Helindone Red 3B Paste—(M)	
	*Thio Indigo Red 3B Paste—(K)	
923	Ursol	485
	Fur Black DG—(A)	
	Fur Brown O—(A)	
	Fur Brown P—(A)	
	Fur Brown 4R Paste—(A)	
	Fur Gray B—(A)	
	Fur Red Brown 6R—(A)	
	Fur Yellow 2G—(A)	
	Fur Yellow 4G—(A)	

UNIDENTIFIED DYES

Acid Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Alizarine Rubinol	2,032
*Alizarine Rubinol 3G Powder—(By)	
*Alizarine Rubinol GW Powder—(By)	
*Alizarine Rubinol R Powder—(By)	
Alphanol Blue BRN Conc.—(C)	100
Brilliant Milling Blue FG—(C)	200
*Cashmere Black TN—(By)	399
Guinea Fast Red 2R—(A)	200
Kiton Fast Yellow 3G—(I)	4,409
Milling Yellow GA—(A)	200
Supramine Black BR—(By)	462

Name of Dye and Manufacturer	Quantity (pounds)
Wool Fast Blue BL—(B)	333
Alizarine Direct Blue A—(Q)	100

Vat Dyes

Algol Brown G Paste—(By)	393
Ciba Printing Black	4,409
*Ciba Printing Black B Paste—(I)	
*Ciba Printing Black G Paste—(I)	
Helindone Brilliant Blue IR Paste—(M)	100
Helindone Brown IGG—(M)	100
Helindone Brown IRT Paste—(M)	100
Helindone Yellow (sgle. stngth.)	948
Helindone Yellow AGC Paste—(M)	
Helindone Yellow AGC Powder—(M)	
Hydron Brown	1,025
Hydron Brown G Paste—(C)	
Hydron Brown R Paste—(C)	
Hydron Green	750
Hydron Green B Paste—(C)	
Hydron Green G Paste—(C)	
Hydron Olive R Paste—(C)	50
*Hydron Orange RF Paste—(C)	661
Hydron Pink	1,045
*Hydron Pink FB Paste—(C)	
Hydron Pink FF Paste—(C)	
Hydron Scarlet 2B Paste—(C)	550
*Indanthrene Brown G Paste—(B)	661
*Indan. Pink B Dbl. Pst. (sgle. stngth.)—(B)	1,006
*Indanthrene Red Violet RRK Paste—(B)	1,850
Thio Indigo (?) R Paste—K	661

Mordant and Chrome Dyes

*Acid Alizarine Gray G Powder—(M)	309
Acid Chrome Yellow GL, RL—(By)	198
*Alizarine Fast Gray 2BL Powder—(By)	1,106
Autochrome Olive Brown G—(M)	10
Brilliant Chrome Violet 3R—(DH)	110
Chrome Fast Garnet BL—(A)	5
*Chrome Fast Phosphine R—(DH)	110
*Chrome Printing Red B, Y—(DH)	551
Chromocitronine 3R—(DH)	110
Chromorhodine BN, BR—(DH)	550
*Chromorhodine 6GN Extra—(DH)	110
Eriochrome Flavine A Conc.—(G)	882
Metachrome Blue Black 2BX—(A)	1,500
Metachrome Brown 6G—(A)	450
Metachrome Olive 2G—(A)	1,000
*Modern Gray RCN—(DH)	220
†Omega Chrome Claret Conc.—(S)	200

Direct Dyes

*Benzo Fast Bordeaux 6BL—(By)	110
Benzo Fast Brown 3GL—(By)	507
Benzo Fast Gray BL—(By)	1,375
Benzo Fast Orange 2RL	525
†Benzo Sky Blue—(By)	17
Brilliant Benzo Fast Violet BL—(By)	602
*Brilliant Benzo Fast Yellow GL—(By)	25
Brilliant Sky Blue 8G Extra—(Q)	235
Chlorantine Fast Violet 2RL—(I)	1,102
†Chlorantine Fast Yellow RL—(I)	440
Developing Blue 2R—(A)	500
Developing Pure Blue GL—(A)	5
Diamine Fast Brown G—(C)	500
Diamine Fast Brown GB—(C)	209
Dianil Fast Orange 2R—(M)	100
Diazanil Pink B—(M)	337
Diazo Brilliant Orange GR, 5G—(By)	498
Diazo Fast Black MG Powder—(By)	500
*Diazo Fast Violet BL—(By)	99
*Diazo Indigo Blue 4GL Extra—(By)	1,566
*Diazo Sky Blue 3G—(By)	551
Fast Cotton Gray VL—(A)	100
Fast Cotton Red 8BL—(A)	200

Basic Dyes

Brilliant Acridine Orange 5R—(DH)	220
Methyl Violet 5R—(M)	50
*Rhodamine Sky Blue 3G—(By)	110

Sulphur Dyes

*Cross-Dye Green B—(BD)	900
Sulphur Olive Brown A Extra—(A)	5

Unclassified Dyes

Azanile B—(Q)	10
Azanile G—(Q)	10
Azanile N—(Q)	10
Azanile R—(Q)	10
Azanile SR—(Q)	10
Blue III—(BC)[1]	90
Blue V—(BC)	90
Golden Yellow VIII—(BC)	270
Red I—(BC)	90
Red V—(BC)	90
Red P Powder—(H)[2]	2

[1]British Celanese, Ltd.; [2]Houbigant.

Color Lakes of Coal-Tar Origin

Name of Lake	Quantity (pounds)
Blue Lake in Lumps	220
Carmine Lake	67
Geranium Lake	67
†Madder Lake VN	765
Madder Pink FK	100
Night Green O Powder	220
Occident Blue Powder	220
Permanent Red	115
Permanent Yellow HDC	250
Permanent Yellow H	50

Name of Lake	Quantity (pounds)
Vermillion Conc.	11
Violet Lake	331
Viridine C Powder	220
Viridine D Powder	220
Viridine Green Powder	110

Supplementary List of Classifications of Dyes

FOR JANUARY

*Night Blue
*Fast Green Extra Bluish
*Chloramine Red 8BS
*Diamine Orange F
*Ciba Pink BG Paste
*Cibanone Orange R Powder
†Rhodamine B Extra
†Direct Fast Black B
*Chlorantine Fast Brown 3GL
*Ciba Bordeaux B Paste
*Ciba Red G Paste
†Cloth Fast Yellow G
*Helindone Red DIBN Extra Paste
†Indigo MLB 6B Powder
*Helindone Violet B Powder
†Acid Violet 4BLO
*Toluidine Blue TN
*Helindone Fast Scarlet R Powder
*Alizarine Black S Paste
*Helindone Golden Orange IRRT Paste
*Helindone Golden Orange TRRT Paste
*Azonine R
†Methyl Violet 5R Extra
*Fast Acid Violet B
*Hansa Yellow G Powder
*Helindone Fast Scarlet R Powder
†Guinea Fast Red 2R
*Columbia Fast Leather Brown 3R
*Columbia Fast Leather Brown RX
*Columbia Fast Leather Brown BX
*Columbia Fast Leather Brown GX
*Fur Brown O
†Fast Cotton Rose 2B
*Fast Cotton Orange 2RL
*Metachrome Violet B
*Fur Blue Black SDF
*Ciba Scarlet G Extra Paste 20%
*Ciba Pink BG Paste 20%
*Ciba Bordeaux B Powder
*Acid Blue RBF
*Pyrogene Brown G
*Ciba Bordeaux B Powder
†Rhodamine B Extra
*Diamine Steel Blue L
*Milling Yellow O
*Brilliant Milling Blue B
*Blue Extra
*Helindone Pink AN Paste 10%
†Indanthrene Yellow G Pdr.
*Helindone Pink BN Paste 10%
*Diazanile Blue 2R
†Alizarine Red DIB New 20% Paste
*Yellow JG
*Helindone Red 3B Paste
*Helindone Golden Orange IRRT Powder
*Helindone Golden Orange IRRT Paste
*Algol Red 5G Powder
*Anthra Yellow GC Powder
*Algol Brown G Powder
*Helindone Golden Orange IRRT Paste
*Indanthrene Golden Orange 3R Paste
*Anthra Yellow GC Paste
*Chrome Yellow CR 1037
†Acid Violet 8B Extra
†Helindone Pink R Ex. Paste

FOR FEBRUARY

*Helindone Golden Orange IG Double Paste
*Vat Brilliant Violet RK Pst. 12½%
*Diazo Brilliant Orange 5G Extra 60%
†Brilliant Geranine B 70%
*Erioglaucine EP 548
*Helindone Corinth IRK Pdr.
*Helindone Golden Orange IRRT Paste 10%
†Nako DR
*Indanthrene Pink B Double Paste
*Indanthrene Red Violet RRN Extra Paste
*Helindone Red IBN Extra Paste
*Fast Green Extra Bluish
*Helindone Golden Orange IG Double Paste
*Vat Brown G Paste
*Indanthrene Red Violet RRK Paste
*Anthra Yellow GC Powder

FOR MARCH

*Erioglaucine EP 548
*Phosphine 3R
*Alizarine Leveling Blue BBS
*Diamine Brilliant Violet B 35%
*Diamine Brilliant Blue G 50%
†Indanthrene Yellow G Double Paste
*Chromorhodine 6GN Extra
*Benzo Fast Blue 4GL
*Chrome Garnet B
*Naphthamine Fast Brown RL
*Guinea Fast Red BL
*Martius Yellow (soluble in water crystals)
*Metachrome Blue Black 2BX
*Zambesi Brown 4R
*Silver Gray P
*Direct Brilliant Blue 8B 83%
*Rosanthrene Orange R 67%
*Poseidon Blue BR Extra
*Diamond Black Pigment
*Azo Carmine GX
*Indanthrene Pink B Double Paste
*Diaminogene Blue NA
†Alizarine Orange RP Paste 20%
*Vat Olive R Powder
*Geranine G 60%
*Fast Green Extra Blue Shade
*Vat Red Violet RRK Powder
*Vat Blue GGSP Double Paste
†Acid Violet 6 BNOO
†Methylene Blue BG Conc.
†Vesuvine BLX
†Magenta Powder AB
*Acridine Orange DHE
†Indanthrene Blue RS Triple Powder
*Ciba Violet B Paste 20%
*Brilliant Benzo Green B 60%
*Helindone Golden Orange IG Double Paste
*Brilliant Benzo Fast Violet BL
†Indanthrene Blue BCS Pdr.
*Algol Red R Extra Powder
*Chloramine Red 8BS

"A DYEING PROBLEM AND HOW I SOLVED IT"

The number of requests for accurate information about dyes and dyeing that come to the office of the publishers of The Reporter lead them to believe that a series of short articles run under the above heading would prove of practical value to every dyer. That problems arise continually in the dyehouse we know; that such problems are very often solved by the ingenuity or the experience or the "book-knowledge" of some dyer, we also feel sure. To obtain, first hand, a description of these problems and, what is most important, a clear explanation of how they were solved, written by practical men in practical dyers' terms, we are going directly to the dyers themselves.

We will pay $5.00 for every letter we receive which we judge suitable for publication. In judging contributions, literary merit, of course, will not be considered, as we shall properly edit them for publication. Simply tell how your particular problem was encountered, the nature of the dyeing or the bleaching or finishing process that you were using at the time, the kind of fabric upon which the trouble showed, and any other necessary details. Then briefly describe the steps you took to overcome the defect and what final conclusion you arrived at; that is, what facts or information did you discover that was "new to you."

Affinity of Basic Dyes for Bleached Sulphite Fiber

Customary Mill Practice—Test for Comparative Affinities Necessary—Method for Determining Relative Affinities—Determining Affinity of Magenta—Bismarck Brown

By G. K. SPENCE

WHEN basic dyes are used for tinting paper stock it is very important that the colorman be familiar with the affinity of the dye for the fiber in the furnish. If care is not exercised when a dye is used which has a strong affinity for the fiber, there will be a tendency for it to fix strongly at the point where the dye is added, before it is mixed thoroughly with the balance of the stock in the beater. The results will be a mottled sheet of paper. This would not be noticed so much in a deeply dyed sheet, but the slightest mottling effect is very perceptible in a tinted sheet. It sometimes produces the appearance of dirt spots in the sheet, especially when these particular fibers are dyed a deep blue.

Customary Mill Practice

When using an acid dye, or one which does not have a strong affinity for the fibers, it is customary for the colorman to measure out the required number of liquid ounces of color used in tinting the paper from a stock barrel. The stock solution is usually made up at the rate of four pounds of dye per thirty-two gallons of water, and from the number of liquid ounces taken the colorman can calculate the amount of dry color used in each beater of stock treated.

When using colors of this nature no further dilution is necessary, and the measure of color is thrown on the stock in the beater at any point. If the stock is moving slowly it is several minutes before that on which the color has been thrown reaches the beater roll and becomes mixed to any extent with the balance of the stock in the beater.

If a basic dye, having a strong affinity for the fiber were handled in this manner the result would be that the color would fix strongly before reaching the roll, and when this stock is mixed with the balance of the stock in the beater a mottled sheet of paper would be produced.

It is this characteristic in addition to the fact that they are not fast-to-light that has made the paper manufacturers skeptical about the use of basic dyes for tinting paper.

Test for Comparative Affinities Necessary

Having been confronted with the necessity of using basic dyes, and the advisability of knowing their relative affinities for the fiber in the furnish, a method was worked out in the laboratory of the writer for determining the relative affinities of the different basic dyes used in tinting paper, for bleached sulphite fibers.

This test has been added to the routine color tests, and the information derived imparted to the colorman so that he is in a position to know how to handle the dye when adding it to the furnish in the beater. Without this information thousands of pounds of paper have been spoiled before he was in a position to know that the new dye produced a mottling effect in the sheet when handled in the customary manner.

Method for Determining Relative Affinities

It is advisable to have bleached sulphite on hand, the moisture content of which is known. This is prepared by taking several pounds of bleached sulphite from a lap, tearing it in small pieces, mixing thoroughly and taking small pieces from different parts of the pile for sample to be tested for moisture content. A number of two-quart Mason jars are filled with this pulp by picking it from different parts of the pile in the same manner in which the sample was taken for moisture test. From the moisture content the value of the sulphite pulp in terms of bone dry fiber is known when weighing it out for the relative affinity test. These jars of stock sulphite are kept in a cool place and in addition to being used for affinity tests can also be used for comparing samples of color by the sheet method.

The dye, the affinity of which is to be determined, is dissolved in water at the rate of .3 gram per 50 c.c.

Weigh out the equivalent of 6 grams of dry sulphite from the prepared sulphite stock, and mix thoroughly in a beaker with enough water to make the total water content 300 c.c. To this sulphite sample add 10 c.c. (equivalent to .06 grams) of the dye solution, mix thoroughly, and allow to stand for twenty minutes. The colored stock is then poured into a hand sheet mould and pressed, the colored water being caught in a graduated cylinder.

The wet pad is weighed and placed in the drying oven until dry, and the difference between the wet and the dry weights will represent the number of cubic centimeters of colored water which was left in the pad after pressing. This number of cubic centimeters should be added to the amount of colored water caught when pressing the pad in order to determine the total amount of colored water left after dyeing the stock.

The colored water is allowed to stand until perfectly

clear of any suspended matter (this is usually allowed to stand overnight), and then compared with some of the original dye solution. The color comparison is made by means of manganese color comparison tubes.

The dilution figure divided into the total number of cubic centimeters of colored water will give the equivalent number of cubic centimeters of the original dye left after the sulphite stock has absorbed its limit under standard conditions. The difference between this amount and 10 c.c. (the amount originally used) will represent the number of cubic centimeters of dye absorbed by 6 grams of bleach sulphite fiber.

The number of cubic centimeters of original dye solution absorbed, multiplied by .006, will give the number of grams of dye absorbed by 6 grams of sulphite fiber, which figure divided by .06 and multiplied by 100 will give the percentage of dye absorbed by 6 grams of sulphite fiber in twenty minutes. It is advisable to make the absorption test at the same temperature each time, a convenient temperature being 72 deg. Fahr.

Determining Affinity of Magenta

In order to better explain the steps taken the following is the result obtained when determining the affinity of magenta for bleached sulphite fiber.

The stock sulphite used contained 68 per cent moisture and 32 per cent bone dry fiber; 18.75 grams of this stock was thoroughly mixed in a beaker with 287.5 c.c. of water, and 10 c.c. of magenta solution (.3 gram per 50 c.c. of water) added, after bringing the temperature to 72 deg. Fahr. The color was thoroughly mixed with the stock, allowed to stand for twenty minutes, poured into a hand sheet mould, pressed, and the colored solution from the mould caught in a graduated cylinder.

Weight of wet pad.....	36.55 grams
Weight of dry pad.....	6.01 grams
Colored water held in pad.....	30.54 grams or c.c.
Colored water caught in cylinder	279.20 c.c.
Total colored water.....	309.74 c.c.

Allowed the filtrate to stand overnight and compared with original dye solution in manganese comparison tubes. The filtrate was 150 times as dilute as the original solution: therefore, the total colored water contained dye equivalent to that present in 309.74 divided by 150 or 2.065 c.c. of the original solution. Therefore, the six grams of bleached sulphite absorbed the dye in 7.935 × .006 = .04761 grams of magenta.

Since .06 grams of magenta was added to the stock, 79.35 per cent of the dye was absorbed, or as we express it: Magenta has a 79.35 per cent affinity for bleached sulphite when using standard proportions. Another way of expressing it would be to say that bleached sulphite will absorb .7935 per cent of its weight of magenta under standard conditions.

Bismarck Brown

Weight of wet pad.....	36.05 grams
Weight of dry pad.....	6.03 grams
Colored water held in pad.....	30.02 grams
Colored water caught in cylinder.	279.10 c.c.
Total colored water.....	309.12 c.c.

Filtrate was 500 times as dilute as the original solution. Therefore, Bismarck Brown has a 93.8 per cent affinity for bleached sulphite under standard conditions.

Relative affinities of several other basic dyes determined by above method:

Basic Blue FN.....	Affinity = 77 per cent
Basic Blue BS.....	Affinity = 75 per cent
Rhodamine BX	Affinity = 63 per cent
Amarine O	Affinity = 63 per cent
Basic Blue No. 26.....	Affinity = 78 per cent
Methyl Violet	Affinity = 88 per cent
Methylene Blue	Affinity = 85 per cent
Paper Blue	Affinity = 88 per cent

What the Difference in Affinity Signifies

From experience with Rhodamine BX it is very evident that there is no perceptible mottling when handled in the customary manner of handling acid dyes. It is, therefore, not necessary for the colorman to exercise any extra precaution in its use. The affinity of this dye for bleached sulphite is 24 per cent. From this we conclude that any basic dye which does not have a higher affinity for bleached sulphite than 24 per cent can be used without any extra precaution to avoid mottling.

On the other hand, it is next to impossible to use Bismarck Brown in any manner in tinted papers without producing some deeply dyed fibers which are readily perceptible in the finished sheet. Since Bismarck Brown has a 94 per cent affinity for bleached sulphite under standard conditions, it is advisable to avoid the use of basic dyes having an affinity approaching 94 per cent in tinted papers. Regardless of precautions taken there will be times when mottled fibers will be seen in the finished sheet if dye with a 94 per cent affinity is used.

Magenta with a 79 per cent affinity must be handled cautiously by the colorman to avoid mottling. It is necessary to dilute it more when adding the dye to the finish, spread it over more surface in the beater, and add it right at the roll where it will mix readily. The same precautions are, therefore, necessary when using any other basic dye with a similar affinity. Basic Blue FN, Basic Blue BS, and Basic Blue No. 26 would be in this class, while Methylene Blue, Methyl Violet and Paper Blue must be handled still more cautionsly.

The colorman soon becomes familiar with the different affinities, and is in a position to know how to handle the dye without danger of mottling the finished sheet of paper.

Technical Notes from Foreign Sources

Benzine Soaps

An article has appeared in the Journal of the Society of Dyers and Colorists on the different solvents that are employed or might be employed in the manufacture of dry cleaners' soaps and the relative advantages and disadvantages of the various liquids used. The investigation included a study of the results that were obtained with petroleum (specific gravity 0.772) to which a proportionate amount of alcohol had been added. The alcohol used was methylated spirit containing 92 per cent of alcohol by weight. The solvent was mixed with soap and used in dry cleaning textile materials.

Solvent naphtha was found to be more suitable than petroleum for dry cleaning, but it has an unpleasant action on the skin and its vapor is toxic. Hard soaps are only slightly soluble in petroleum, and are therefore less serviceable than the more soluble soaps that are prepared from oleic acid. Methylated spirit is only slightly soluble in petroleum, although petroleum and absolute alcohol are completely miscible. The stability of various mixtures of petroleum, soap, alcohol and water was examined and the results tabulated and expressed in the form of curves.

Preparation of a Cold-Water Starch

German Patent No. 381,516 is concerned with a process of manufacturing a cold-water starch; in other words, a starch which will give a properly made sizing mixture with cold water. The process consists in allowing concentrated solutions of hydroxides of the alkaline earths to act on starches, solubilized starch and substances that contain starchy matter. For example, calcium, strontium, barium and magnesium hydroxides may be used at an elevated temperature. After the starch granules have swelled up, then the hydroxides are neutralized with salts or acids, such as sodium carbonate, sodium oxalate, oxalic acid and the like. Starch which has been treated in this manner will give adhesive and sizing composition when dissolved in cold water. It finds important application in the textile industry as a sizing material, as a binder in making color pastes particularly for printing fabrics and as an adhesive.

The Bleaching Process

An interesting discussion of the bleaching process is given in an article in the German technical magazine Zeitschrift fuer angewandte Chemie, 1924, page 97. The author studies the explanation which is accredited to Schwalbe and Wenzyl, and which seems to account for the greatly increased rate of bleaching obtained when nitrogen or air-free carbon dioxide is passed through the material under treatment, and he comes to the conclusion that it is insufficient. There is no reason to suppose that the carbon dioxide formed by the action of the bleaching solution on any organic matter present would so inhibit the bleaching action that the removal of that gas by a current of another gas would produce the acceleration observed. It is concluded that the matter is of such practical importance to the bleacher that it should be further studied, so scientifically accurate deductions may be made and then applied to practical operations.

Bleaching Damage Determined by Methylene Blue

The practicability of the Ostwald method of color mensuration is again emphasized in an article that appeared in the Journal Cellulosechemie, 1924, page 8. The main subject of the article is the description of a method for determining the damage that is done by the bleaching process to textile fabrics by the aid of methylene blue, which is employed as an indicator. The standards of the Ostwald system of color mensuration are employed.

As has been explained in the articles on this system that have appeared in the AMERICAN DYESTUFF REPORTER, Ostwald uses as standard a normal white which is obtained by the aid of barium sulphate. There are then one hundred stages of gray between this and the normal black. It was found that on this scale a commercial bleached cotton has a value of 70 to 80 degrees of white. The damage that is done the cotton fiber by the bleaching agents is indicated by an increased affinity for methylene blue. The comparison between the various degrees of white in the original sample and the degree of white in the sample that has been dyed with methylene blue can be obtained as a ratio. This ratio may be designated as Q. Thus the ratio may be Q in the case of bleached goods and Q_1 in the case of unbleached goods. The methylene blue value may then be expressed as the difference produced by the bleaching. In mathematical terms it is equal to the following expression:

$$M = \frac{(Q - Q_1)}{Q_1}$$

The dyeing operation is carried out by treating approximately 5 sq. cm. of the fabric with 500 c.c. of a cold solution of methylene blue containing 0.001 per cent of the dyestuff for a period of ten minutes. The goods are then rinsed with water and dried in contact with a smooth surface. The degree of white in the fabric is then determined by the Ostwald color method.

Practical tests were made with goods that had been bleached with hypochlorite. The tests showed that

the methylene blue value increases both with concentration of chlorine and also with increase in the temperature of the bleaching bath. It was also found that the alkalinity of the bath had no effect on the methylene blue value and that the acidity of the bleach liquor had but a slight effect on this factor.

It was brought out in the article that cotton, which has a methylene blue value less than twenty, may be considered as being free from oxycellulose. It was also determined that a permanganate bleach will produce far more oxycellulose than a hypochlorite bleach which contains the same amount of active oxygen. The methylene blue value is augmented by an increase in the concentration of the permanganate solution and also by an increase in the temperature of the bleach liquor. A hot peroxide bleach is apt to damage the cotton very severely.

RECENT PATENTS

Dyestuffs Containing Chromium and Process for Manufacture of Same

(1,488,411; March 25, 1924)

Fritz Straub, Basel, and Hermann Schneider, Riehen, near Basel, Switzerland, assignors to Society of Chemical Industry in Basle, Basel, Switzerland.

As a new product the herein described new dyestuff containing chromium which is a derivative of the azo dyestuff of the formula, which forms a bronze powder soluble in pure water to a blue to green black solution, and in dilute caustic alkalies to a blue violet solution, dyeing wool in an acid bath blue to green blue tints of exceilent uniformity, prominent fastness to light, and very good fastness to fulling.

Dyeing of Cellulose Acetate, Artificial Silk, Films and the Like

(1,489,814; April 8)

Maurice Ernest Bouvier, Lyon, France, assignor, by mesne assignments, to La Societe pour la Fabrication de la Soie "Rhodiaseta," Paris, France, a corporation of France.

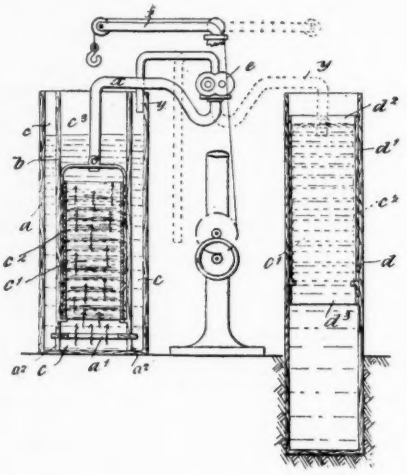
A process for treating cellulose acetate films, silk and the like previous to dyeing, consisting in treating the cellulose acetate with a relatively concentrated solution of neutral salts of alkali metals to which a salt with an alkaline reaction, adapted to act as an alkali in the saponification of the acetate, is added in quantity less than is reuired to make a 1 per cent solution.

Process for the Washing and Degumming of Fibers

(1,489,546; April 1)

Reuben Levi Pritchard, London, England.

A process for washing and degumming fibers which comprises immersing a quantity of fibers in a liquid,



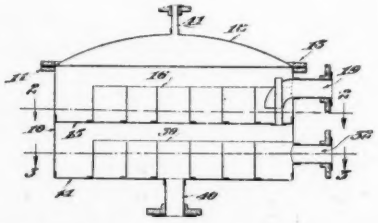
maintaining the fibers floating in a segregated condition in said liquid, circulating vertical currents of the liquid between the fibers and preventing the liquid from flowing laterally.

Liquid Mixer

(1,490,333; April 15)

Frank E. Lichtenthaeler, Newton Highlands, Mass.

A liquid mixer having in combination two superposed channels for containing and conducting liquids to be



mixed, the upper channel being provided with discharge openings throughout its length for discharging liquid from the upper channel into the lower channel so as thereby intimately to mix the liquid from the upper channel with the liquid in the lower channel.

Dyestuff

(1,490,646; April 15)

John Thomas, Carlisle, England, assignor to Scottish Dyes, Ltd., Carlisle, Cumberland, England.

The method for the production of a black body which consists in the treatment of 2-amino-anthraquinone suspended in nitrobenzene with antimony pentachloride, separation of the flavanthrone thus produced and removal of the nitrobenzene from the remaining liquor.

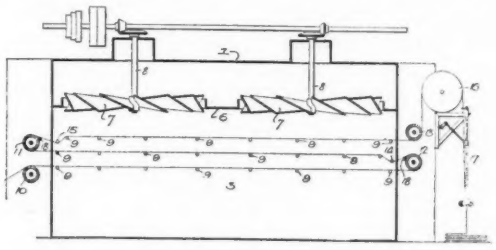
The method for the production of a vat dyestuff which consists in treatment of the black body prepared according to the method claimed by means of a bichromate in the presence of sulphuric acid solution at a temperature of about 100 deg. Cent. for several hours, filtering and washing off the yellowish-brown paste thus formed.

Apparatus for Drying Piece Goods

(1,491,665; April 22)

Hermann Bogaty, Philadelphia, Pa., assignor to Proctor & Schwartz, Inc., Philadelphia, Pa., a corporation of Pennsylvania.

The combination in a drying apparatus, of a casing having a drying chamber therein; circulating fans in the upper portion of the chamber; transverse supporting bars for the material, said bars being arranged in series, one



series above the other; and driven rollers at each end of the drier, the casing having a feed opening in line with the lower series of supporting bars and a discharge opening in line with the upper series of bars so that the material passing through the drier will be subjected to the direct action of the heated air in circulation as it leaves the drier.

Anthracene Dye and Process of Making Same

(1,492,110; April 22)

Harold T. Stowell, Buffalo, N. Y., assignor to National Aniline & Chemical Company, Inc., New York, N. Y., a corporation of New York.

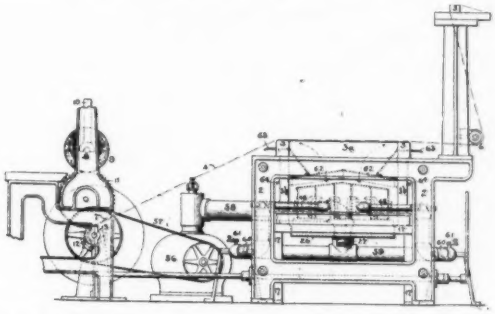
As a new product, the coloring-matter obtainable by treating flavanthrone with fuming sulphuric acid in the presence of boric acid at a temperature of about 125 deg. Cent., which coloring-matter is practically insoluble in water but dissolves in ordinary concentrated sulphuric acid giving a red solution and in fuming sulphuric acid containing 25 per cent. of free sulphuric anhydride giving a blue solution; and which dissolves in an alkaline sodium hydrosulphite solution giving a blue solution which solution acts as a vat and dyes textile fiber, especially cotton, bluish shades which upon suitable exposure to air give yellowish brown shades fast to light.

Moistening Device for Textile Machinery

(1,491,785; April 29)

Herman C. Brehmer, Philadelphia, Pa., assignor to H. W. Butterworth & Sons, a corporation of Pennsylvania.

In a spraying device for textile machinery, the combination with means for guiding a fabric in web form, of spraying means arranged below the fabric, comprising a plurality of parallel tanks separated at a distance apart, an air conduit arranged in the space between the tanks, pressure devices for supplying air to the conduit, two sources of air nozzles opening upward from the air conduit, and angular pipes arranged in each of the tanks extending through the side walls thereof and terminating in nozzle portions adjacent to the air nozzles whereby



the air blast causes the water from the tanks to be sprayed from the last mentioned nozzles and projected upwardly between the tanks toward the fabric, said tanks also provided with means for supplying water thereto, and overflow devices for maintaining a substantially constant level of water within the tanks.

John Campbell & Co. announce the removal of their Providence, R. I., office and warehouse, heretofore located at 41 Fountain Street, to 107 Broadway, Providence. E. A. Williams, formerly of Starkweather & Williams, will be in charge.

An anti-tarnish test for wrapping papers, which has been developed recently, is becoming more generally used by manufacturers who wish to avoid tarnishing of their products, according to reports from the United States Testing Company, Inc.

By chemical analysis it can be determined whether there are any sulphur compounds present in the paper which will oxidize with the air to form a silver or other metallic sulphide, blackening or tarnishing the surface of the metal.

The test is being used by textile manufacturers as a protection for silver and gold cloth fabrics, fringes, metallic ornaments, slippers, etc.

NEWPORT STEEL BLUE LGN

Newport Chemical Works, Inc., Passaic, N. J., announces the production of a new product by the name of Newport Steel Blue LGN, which has good fastness to washing and fair fastness to light and weather. It is a useful color for producing Steel Blue shades on union material of cotton or wool. It is also useful for mode shades on pure and artificial silks.

Bureau of Chemistry, Department of Agriculture, has been making a study of waterproofing, mildewproofing and fireproofing of fabrics. The addition of certain mineral pigments to preparations used in waterproofing of fabrics has been found to have a beneficial effect in reducing the weakening effect of solar light. The introduction of long distance hauling by motor cars has increased the need for water-resisting covers.

The Texdel Chemical Company, Inc., manufacturer of dyes and intermediates, is now located at 136 Water Street, this city, E. Daniel Fisher being sales representative. The factory is located at Nutley, N. J.

Herman A. Metz, dye manufacturer and importer, this city, sailed May 5th on the *Olympic* for Germany, where he will remain on business for a few weeks.

Roessler & Hasslacher Chemical Company, New York, has purchased life insurance policies for all office employees of the company who have been in its employ for two years or more. Those who have been with the firm two years, but less than three, receive $1,000 certificates. Between three and four years' service receives $1,250 certificate, which ranges upward according to service, until $3,000 is reached. Each year is worth $250 until the maximum of $3,000 is received. The policies which have been issued by the Travelers Insurance Company, Hartford, Conn., carry disability clauses payable to the employee before the age of sixty.

Wilson C. Laucks has registered at the court house at Reading, Pa., as a broker in dyestuffs and chemicals, with place of business at 143 Wunder Street, Reading, Pa., under the name of the Textile Chemical Company.

The business of the Swiss Electrochemical industry was unsatisfactory in 1923, as was that of other branches of the Swiss chemical industry which had to pay high freights upon supplies of raw materials. On the other hand, the business of the Basel color industry was considerably better than in 1922.

The 20,000 employees of Badische Anilin und Sodafabrik have accepted the nine-hour day and returned to work. They will receive a wage increase of 11 per cent. The strike leaders were expelled from the district.

ANNUAL MEETING, PHILADELPHIA TEXTILE SCHOOL ALUMNI ASSOCIATION

The Alumni Association of the Philadelphia Textile School will hold its Twenty-third Annual Meeting on June 5th and 6th.

On the first day, June 5th, there will be a luncheon at the school, followed by a business meeting at which will be read, in addition to reports of committees and officers, technical papers on textiles, patents and trademarks, research, and dyeing and finishing

The annual cruise and outing and the annual banquet will take place the following day, June 6th. The main features of the outing, which will be held at the Philmont Country Club, will comprise games of baseball, tennis and gold for gold and silver trophy cups. A lunch will be served at 1 o'clock. The banquet at the Manufacturers' Club, Philadelphia, will have as a special feature in connection with the close of the Philadelphia Textile School's fortieth year, an address by Samuel M. Vauclain, president of the Baldwin Locomotive Works.

Reservations for the banquet should be in the hands of the committee before noon, June 5th. It will be possible for guests to make up their own groups at tables. The fee is $5 per person. Members may bring guests, but in making reservations should give the names and business connections of their guests.

A BOOKLET FOR PLANT OWNERS

A new booklet for plant and mill owners, entitled "How Many Values Has Your Property?" has been issued by Lockwood, Greene & Co. covering the subject of valuation and appraisal of plant property for various purposes, plant reorganization, mergers and consolidations, estates, partnerships and other phases of commercial valuation methods. This booklet may be obtained by writing to Lockwood, Greene & Co.

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WANTED—Empty iron dyestuff barrels. Must be in A-1 condition. State quantity and price. Address Box 255, American Dyestuff Reporter.

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This product is primarily intended for use on white mercerized cotton goods in order to increase the lustre due to the mercerizing operation. It can be used with equally good results on ordinary cotton goods which are subsequently subjected to the usual operation of callendering or schreinering. The lustre produced stands up well in storage or handling; the goods do not turn yellow nor is any odor developed by long storage.

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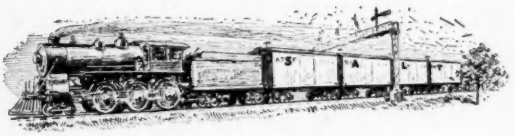

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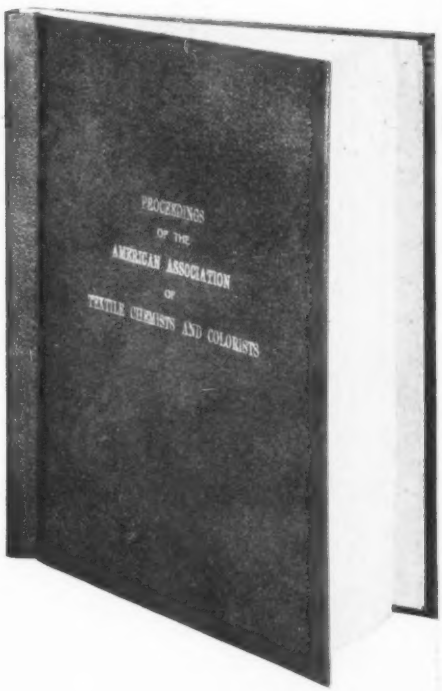

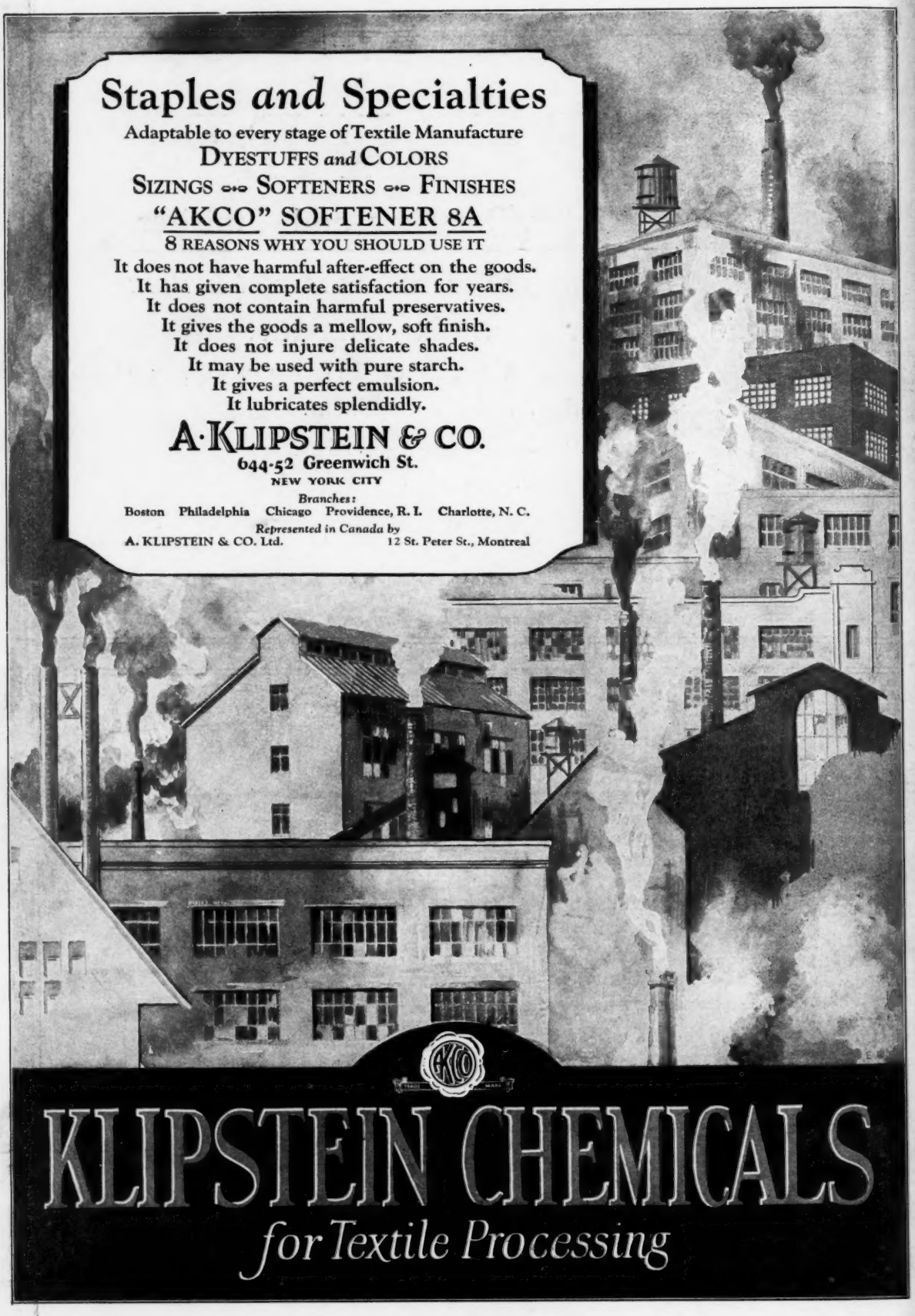
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